Advisory Council on Science and Technology
Conseil consultatif des sciences et de la technologie

SUPPORTING DOCUMENT
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EXECUTIVE SUMMARY

An Inventory of Relevant Public Policy Advice, Policies, and Programs

Prepared for the Expert Panel on Skills
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June 1999

Canada

Executive Summary
An Inventory of Public Policy Advice, Policies and Recommendations Concerning Skilled S&T Personnel in Canada

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Introduction

The initial statement describing the inventory project at CPROST was simple and brief: What pieces of information in the public domain and available through the electronic highway, produced by governments and non-governmental agencies in the public sector, would be relevant to discussions by the Expert Panel on Skills of the ACST?

Selected Issues

The original mission was to prepare a critical inventory of material relevant to the discussions of the Expert Panel on the supply of, and demand for, skilled S&T labour in various industrial sectors. On examining the inventory there are some issues that appear to cut across many of the entries in the inventory. These issues are by no means new, nor are they dealt with exclusively in the material in the inventory.

In each case the issues bear on one or more linkages within the national system of innovation. They are either barriers to transfers of knowledge (and of people) between institutions, or constraints on the operations of the institutions themselves. In searching for ways to improve the functioning of the national system of innovation, each of the issues is examined with a view to determining how it can be made to assist in the overall creation and application of knowledge in Canada to the nation's economic and social benefit. References to specific web-sites are contained within the text rather than footnoted or placed at the end of this report.

Who Should Train Skilled Labour?

On the face of it, the education of Canadians, and the preparation of some of them as entrants in the skilled labour workforce is seen to be a public good, funded through the tax system by all Canadian taxpayers. Yet employers complain that the secondary and post-secondary systems do not produce the skilled labour they need. This suggests that the linkages between educational institutions and industry (and possibly government) are not as effective as they might be. According to industry, recent graduates from post-secondary training programs are lacking in one or more skills that would enable them to become productive in industry immediately upon recruitment. The inventory reveals many recommendations for coordinating mechanisms, such as labour training boards, some of which are sector specific. In general, they recommend a cooperative approach to setting standards for training, involving all of the stakeholders (academia, industry and both levels of government).

There appears to be, however, no consensus. Should industry, take on some form of entry-level training role? Should the taxpayer be expected to deliver a fully-trained worker to the door of a factory, and turn over this valuable (publicly funded) asset to private enterprise, in the uncertain expectation of recovering the investment in the future through personal and corporate income taxes? Is industry being unrealistic in its expectations of recent graduates, in assuming they can immediately enter the workplace as productive participants, or should it be taken for granted that publicly-funded systems will always lag industrial requirements, and that industry will always, of necessity, have to finish off at the training of entry level recruits?

But a consensus needs to be found. This consensus might be sector specific - for example in the automotive and aerospace sectors, industry may well want to take on responsibility for some elements of an apprenticeship program, providing a "finishing" education to recruits, regardless of whether they are technicians, technologists or post-graduate engineers. On the other hand, rapidly growing industries may not have the luxury of the time to establish training programs. Studies of SMEs carried out by Statistics Canada in 1993 (Strategies for Success: A profile of growing SMEs in Canada, Statistics Canada, Catalogue 61-523R E) have shown that the more successful firms relied, in no small degree, on poaching skilled workers from their less successful competitors, and that it was the less successful firms that relied on government-sponsored training programs (presumably to replace the skilled workers they had lost).

The information technologies (IT) sector provides possibly the most extreme example of this phenomenon. There is a perceived shortage of skilled programmers in certain specific fields, yet there many individuals who are computer-literate and who are capable of learning these specialized computer languages quickly. Is demanding that an entry-level recruit be completely up-to-date with the latest versions of networking languages an unrealistic expectation? Are IT firms trying to recruit experienced programmers at entry-level salaries? One IT firm in the US specifically recruits entry level system designers associates from non-traditional areas such as music, ancient languages and philosophy rather than computer sciences and engineering because they believe the actual technicalities of their projects are easily learned on the job. Yet in Canada, an HRDC-sponsored project (FutureWorks, <<**http://www.future-works.bc.ca**>>) that specializes in placing hard-to-place S&T professionals who have been on unemployment insurance, had to set up a special six-month course at the University of British Columbia to retrain scientists and engineers in the latest computer languages - but the graduates, with one exception all walked out into new jobs in software firms.

The Brain Drain

Early studies in this field were hampered by the fact that Canada does not keep accurate statistics on emigrants, only immigrants. As a consequence we can estimate the influx of talent into the NSI but can only guess at the loss of knowledge out of the NSI, primarily to the United states. As a generalization, Canadian skilled labour tends to emigrate to the United States and is partially replaced by immigrants from other countries.

Much has been said (especially by the Fraser Institute <<**www.fraserinstitute.ca**>>) about the brain drain of the highly skilled workforce to the United States, but the fact is that many graduates from Canadian S&T programs voluntarily remain in Canada and reject the lure of high-paid, US dollar jobs. For example, the tax disincentives often cited by critics as sustaining the brain drain may actually be offset by the advantages of socialized medicine and subsidized education opportunities. The Vancouver Centre of Excellence – Research on Immigration and Integration in the Metropolis suggests that human capital transfers could be mitigated in some fields, such as health care, through a more careful measurement of demand and match to supply. They also suggest that concerns about the brain drain also disregard the influx of highly skilled immigrants to Canada. If the barriers to participation in the Canadian economy – e.g. certification and settlement problems – were minimized, then the effects of the perceived brain drain would be much less severe. <<**www.riim.metropolis.globalx.net**>> Their papers include work carried out by Prof. Don DeVoretz of Simon Fraser University, who prepared a paper for the Expert Panel.

But if salaries are lower, and taxes are higher, in Canada, why would any skilled labour remain here? What are the conditions that ensure that the vast majority of Canadian skilled labour stays in Canada? There are a number of answers, none of which by themselves is convincing. Some studies suggest that when both direct salaries and indirect costs and benefits are taken into account, Canadians and Americans, doing similar jobs, are paid approximately the same. Do Canadians set a value on "quality-of-life",a value that could be calculated as the residual difference between the total benefits and costs of employment in the US versus Canada? Is the fact that Canadians do stay, a reflection of the substantial difference between the rates of exchange between the US and Canadian dollars when measured on a purchasing power parity basis versus the conventional currency exchange rates? Perhaps we should be addressing a new set of questions, particularly in the context of skilled employees. Why do you like living here? Why don't you move to the US? Answers to questions such as these might have an important place in policy recommendations.

Gender Differences, or Why Don't Girls Study Mathematics?

If our problems with skilled labour revolve around shortages of skilled entrants into the labour force, why is it that half of the population is significantly under-represented in most of the skilled occupations in the industrial sectors reviewed? Why are women still only a minority in most natural sciences and engineering programs at the post-secondary level? This is an issue which has been examined by a number of researchers, most of whom identify the high drop-out rate of girls in mathematics in the early secondary years? Is it a matter of social pressure, or is the curriculum geared to boys rather than girls? Why is it not possible for girls to take remedial mathematics courses to catch up with their male peers, so that they have an equal opportunity to enter post-secondary programs? Why is it that most post-secondary S&T programs operate on a "one strike and you're out" basis, that eliminate individuals weak in mathematics (whether male or female) with no hope of re-entry?

Judith Maxwell (see the "Canadian Policy Research Network" <<**www.cprn.org**>>), has commented extensively on the need to empower women in the knowledge-based economy. This is an issue which is growing in importance as the development of knowledge networks, the "digitization" of

knowledge as described by Heather Menzies of Carleton University, telecommuting, etc. alter the workplace, particularly in the services sector.

Gender imbalances in the workforce – as manifest in remuneration, representation, and advancement – have long been a part of the public consciousness. The process of bringing women into the highly skilled workforce is a something which has been underway for many years, and will take many more years to complete. Compared to men, women have always been poorly represented in math and science fields in academia and employment; and yet attempts to correct this disparity have been only marginally successful. The Canadian Council of Professional Engineers reported an increase in the percentage of undergraduate engineering degrees that are awarded to women, from 11% in 1986 to 19% a decade later <<**www.ccpe.ca/english/newsletter/winter96/PRESSWOM.htm**>>. Considering the vast gap that still exists, an increase of 8% seems to be only a small step towards comparable representation of the sexes in a highly skilled field.

Some small initiatives have attempted to address the reasons why girls tend to turn away from math and science courses at a young age. It has been suggested that alternative forms of education may be necessary to reach this population. GirlsAreIt! <<**www.girlsareit.com**>> is an example of a program calculated to attract girls to technology-related interests. The project, operational in many Canadian centres, motivates girls to learn the practical applications of technology in the form of team website design.

What is the Relationship Between Skills and Innovation?

The assumption is made that highly skilled employees are the most productive and innovative. Is this really true (the American computer firm mentioned above clearly differentiates between highly skilled and highly trained)? Preliminary results from recent research carried out on innovative firms in British Columbia by the Centre for Policy Research on Science and Technology <<**www.cprost.sfu.ca**>> suggests, perhaps not unsurprisingly, that there is a definite correlation between innovativeness in a firm and the way it manages both its highly qualified employees and its knowledge assets (which are, of course, people-based). Perhaps the environments that stimulate innovation in a firm also stimulate productivity and tacit skills acquisition in employees.

Skills are part of the innovative environment – thus training and retraining should be part of the policy environment created by governments to foster innovation. These linkages need to be explored in more detail, and in different regions – the industrial environment of southern Ontario and Quebec is clearly different from that in the West or the Maritimes. The Canadian Advanced Technology Alliance conducted a survey in 1997 to assess the factors which influence highly-skilled individuals' decisions to work for, and remain with, a company. The survey concluded that along with financial incentives (such as tax breaks and benefit programs) high-tech workers will select companies "that exhibit the values of entrepreneurship and innovation" <<**www.cata.ca/cata/news/kpmgpoll.htm**>>. The Ontario Jobs and Investment Board Special Advisory Panel on Innovation focussed on the challenge of creating an innovation culture, by rewarding innovation at a young age and "shaping the future innovators in our youth". The Panel recognizes the essential role of a strong infrastructure in effecting cultural change. If universities, colleges, laboratories, and other technology-based

networks are under-resourced, then the ability to promote a culture of innovation is compromised. **<<http://204.101.2.101/jobgrow/papers/innovat.html>>**.

Conclusion: Policy Advice to the Expert Panel

In summary, the project of assembling an inventory of advice and recommendations on skills in Canada, has produced a number of suggestions for initiatives by the Expert Panel. These recommendations relate to specific constraints that affect the flow of knowledge and people between various elements of the national system of innovation (NSI) – there are undoubtedly other bottlenecks. In relating these issues to the NSI, it is hoped that the OECD's wish, to study the systemic problems of technology policy, can be fulfilled. The recommendations are:

- develop a policy on the relative roles of state-supported post-secondary education and on-the-job training;

- determine of the factors influencing the retention of highly-skilled workers in Canada;

- prepare a specific survey of existing research, and perhaps further synthesis of that research on why girls drop out of mathematics courses in secondary school;

- search for options for make-up and remedial activities in mathematics to reduce drop-out rates in post-secondary education in the natural sciences and engineering;

- develop a better understanding of the links between innovation in firms and the acquisition and management of highly skilled labour.

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SOMMAIRE

Inventaire des avis, politiques et programmes dans le domaine des compétences en science et technologie au Canada

Préparé pour le Groupe d'experts sur les compétences
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Juin 1999

Canada

Sommaire

Inventaire des conseils, stratégies et recommandations en matière de politique gouvernementale sur le personnel spécialisé dans les S-T au Canada

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Introduction

L'énoncé initial décrivant le projet d'inventaire du CPROST était à la fois simple et bref : « Quels renseignements du domaine public et disponibles sur l'autoroute électronique produits par des gouvernements et des organismes non gouvernementaux du secteur public seraient utiles aux discussions du Groupe d'experts sur les compétences clés du CCST? ».

Questions retenues

La mission initiale consistait à dresser un inventaire critique des documents utiles aux discussions du groupe d'experts chargé de l'offre et de la demande de main-d'œuvre spécialisée dans les S-T dans divers secteurs industriels. En examinant cet inventaire, on constate que certains problèmes sont communs à plusieurs entrées. Ces problèmes ne sont pas du tout nouveaux et ne sont pas traités explicitement dans les documents constituant l'inventaire.

Dans chaque cas, les problèmes portent sur un ou plusieurs des liens existant au sein du système national d'innovation. Ils constituent soit des obstacles au transfert de connaissances (et de personnel) entre institutions, soit des contraintes imposées au fonctionnement de ces mêmes institutions. En cherchant des moyens d'améliorer le fonctionnement du système national d'innovation (SNI), on examine chacun des problèmes en vue de déterminer comment on peut les exploiter pour faciliter la création et l'application de connaissances à l'échelle du Canada, pour le bienfait social et économique du pays. Les références à certains sites Web sont intégrées au texte au lieu de figurer dans des notes en bas de page ou à la fin du présent rapport.

Qui devrait former la main-d'œuvre qualifiée?

À première vue, l'éducation des Canadiens et la préparation de certains d'entre eux à l'intégration à une main-d'œuvre qualifiée sont considérées comme un bien pour le public, financé par les contribuables canadiens. Pourtant, les employeurs se plaignent du fait que les systèmes d'éducation secondaire et postsecondaire ne produisent pas la main-d'œuvre qualifiée dont ils ont besoin. Il semble donc que les liens entre les établissements d'enseignement et l'industrie (et éventuellement le gouvernement) ne soient pas aussi efficaces qu'ils pourraient l'être. Selon les représentants de l'industrie, il manque aux récents diplômés de programmes de formation postsecondaire une ou plusieurs compétences qui leur permettraient de devenir productifs au sein de l'industrie immédiatement après leur recrutement. L'inventaire donne lieu à un grand nombre de recommandations portant sur la création de mécanismes de coordination, par exemple les

commissions de formation de la main-d'œuvre, dont certaines se consacreraient à un secteur précis. En général, on recommande une approche coopérative d'établissement de normes de formation, à laquelle participeraient tous les intervenants (les universitaires, l'industrie et les deux paliers de gouvernement).

Il semble malheureusement qu'aucun consensus n'ait été atteint. Les membres de l'industrie devraient-ils jouer un rôle de formateurs vis-à-vis des débutants? Les contribuables devraient-ils financer l'accession aux usines de travailleurs pleinement formés et faire cadeau de ce précieux atout (financé par le secteur public) à l'entreprise privée, en attendant la récupération incertaine des investissements engagés, par le biais des impôts sur le revenu des particuliers et des sociétés? Les attentes des membres de l'industrie vis-à-vis des récents diplômés sont-elles irréalistes, dans la mesure où ils pensent que ceux-ci peuvent être productifs dès leur entrée sur le marché du travail; ou faut-il tenir pour acquis que les systèmes financés par le secteur public seront toujours en retard sur les normes de l'industrie, et que l'industrie devra toujours, par nécessité, « terminer » la formation des nouvelles recrues?

Il faut en tout cas trouver un consensus. Ce consensus pourrait être propre à chaque secteur - par exemple, les intervenants des secteurs de l'automobile et de l'aérospatiale voudront peut-être assumer la responsabilité de certains éléments d'un programme d'« apprentissage » qui permettrait de « terminer » la formation des recrues, qu'ils soient techniciens, technologues ou ingénieurs diplômés. Par ailleurs, il se peut que les secteurs connaissant une croissance rapide n'aient pas le temps de mettre sur pied des programmes de formation. Les études sur les PME effectuées par Statistique Canada en 1993 (« Stratégies de réussite : profil des petites et des moyennes entreprises en croissance au Canada », Statistique Canada, n° de catalogue 61-523-RPF) ont montré que les entreprises les plus florissantes s'appuyaient largement sur le recrutement de travailleurs qualifiés employés chez leurs concurrents moins florissants, et que les entreprises moins florissantes comptaient sur des programmes de formation financés par le gouvernement (probablement pour remplacer les travailleurs qualifiés qu'elles avaient perdus).

Le secteur des technologies de l'information (TI) est peut-être l'exemple le plus extrême de ce phénomène. On observe une carence de programmeurs qualifiés dans certains domaines, mais il existe quand même un grand nombre de personnes qui connaissent l'informatique et peuvent apprendre rapidement ces langages spécialisés. Est-il irréaliste d'exiger d'un employé débutant qu'il connaisse parfaitement les toutes dernières versions des langages de réseautique? Est-ce que les compagnies spécialisées dans la TI essaient de recruter des programmeurs d'expérience en leur offrant un salaire de débutant? Aux États-Unis, une de ces compagnies recrute précisément des concepteurs de systèmes débutants dans des secteurs non traditionnels comme la musique, les langues anciennes et la philosophie, plutôt que dans l'informatique et le génie, parce que ses responsables croient qu'il est plus facile de se familiariser sur le tas avec les aspects techniques des projets à gérer. Au Canada, les responsables d'un projet financé par DRHC (FutureWorks, <<www.future-works.bc.ca>>), qui consiste à placer des professionnels des S-T qui sont au chômage, ont dû mettre sur pied un cours spécial de six mois à l'Université de la Colombie-Britannique, en vue de recycler les scientifiques et les ingénieurs en leur apprenant les tout derniers langages informatiques – mais les diplômés, à une exception près, ont tous accepté un nouvel emploi chez des fabricants de logiciels.

L'exode des cerveaux

Les premières études dans ce domaine étaient limitées par le fait que le Canada ne conserve pas de données exactes sur les émigrants, mais seulement sur les immigrants. Par conséquent, alors qu'on peut estimer l'arrivée de gens de talent au sein du SNI, on doit se contenter de deviner combien de spécialistes du savoir quittent le SNI, principalement à destination des États-Unis. En règle générale, la main-d'œuvre qualifiée canadienne a tendance à émigrer aux États-Unis et elle est en partie remplacée par les immigrants en provenance d'autres pays.

L'exode des cerveaux, et particulièrement l'émigration de la main d'œuvre qualifiée vers les États-Unis, a fait couler beaucoup d'encre (le Fraser Institute <<www.fraserinstitute.ca>> s'y intéresse notamment), mais il reste que de nombreux diplômés de programmes canadiens de S-T restent volontairement au pays et résistent à l'attrait des emplois bien rémunérés offerts aux États-Unis. Il est donc fort possible que les obstacles fiscaux – souvent mentionnés comme étant à la source de l'exode des cerveaux – soient contrebalancés par les avantages de la médecine socialisée et du système d'éducation subventionné. Selon la Recherche sur l'immigration et l'intégration dans les métropoles effectuée au Centre d'excellence de Vancouver, les transferts de capital humain pourraient être minimisés dans certains domaines, notamment celui de la santé, si l'on créait un meilleur équilibre entre l'offre et la demande. Cet organisme déclare, en outre, que les personnes qui s'inquiètent de l'exode des cerveaux ne tiennent pas compte de l'arrivée au Canada d'immigrants qualifiés. Si les obstacles à la participation à l'économie canadienne – notamment les problèmes liés à l'accréditation et à l'intégration – étaient minimisés, les effets de l'exode des cerveaux perçu seraient beaucoup moins importants.
<<www.riim.metropolis.globalx.net>> Les articles du centre portent notamment sur les travaux du professeur Don DeVoretz de l'Université Simon Fraser, qui a rédigé un article pour le groupe d'experts.

Si les salaires sont inférieurs et les impôts plus élevés au Canada, pourquoi les travailleurs qualifiés restent-ils? Quelles conditions font en sorte que la vaste majorité des travailleurs qualifiés demeurent au Canada? Il y a plusieurs réponses, mais aucune d'entre elles n'est convaincante par elle-même. Certaines études affirment que, compte tenu des salaires directs, des frais indirects et des avantages sociaux, les Canadiens et les Américains qui occupent des postes similaires gagnent à peu près le même salaire. Les Canadiens accordent-ils une certaine valeur à la « qualité de vie », valeur qui pourrait être calculée comme étant la différence entre les avantages et les coûts liés à l'emploi aux États-Unis et au Canada? La décision de rester au Canada est-elle le reflet de la différence énorme qui existe entre le taux de change du dollar américain et du dollar canadien lorsque celui-ci est calculé en fonction du pouvoir d'achat respectif de chaque pays, plutôt que d'après les taux de change habituels?

Il faudrait peut-être poser une nouvelle série de questions, particulièrement en ce qui a trait aux employés qualifiés. Pourquoi aimez-vous vivre ici? Pourquoi ne déménagez-vous pas aux États-Unis? Les réponses aux questions comme celles-ci pourraient occuper une place importante dans les recommandations en matière de politique.

Les différences entre les sexes, ou pourquoi les filles n'étudient-elles pas les mathématiques?

Si les problèmes auxquels nous sommes confrontés en ce qui concerne la main-d'œuvre qualifiée sont dus à une grave pénurie de travailleurs qualifiés débutants, pourquoi la moitié de la population est-elle sous-représentée dans la majorité des métiers spécialisés des secteurs industriels étudiés? Pourquoi les femmes constituent-elles une minorité dans la plupart des programmes de sciences naturelles et de génie au niveau postsecondaire? De nombreux chercheurs se sont penchés sur cette question, et nombre d'entre eux ont souligné le pourcentage important de jeunes filles qui abandonnent les mathématiques dans les premières années de leurs études secondaires. Est-ce une question de pression sociale ou le programme de cours s'adresse-t-il aux garçons plutôt qu'aux filles? Pourquoi n'offre-t-on pas aux jeunes filles des classes d'appoint en mathématiques pour leur permettre de rejoindre leurs collègues et, par le fait même, assurer l'égalité d'accès aux programmes d'études postsecondaires? Pourquoi la plupart des programmes de S-T accordent-ils une seule chance de réussir, éliminant ainsi les étudiants faibles en mathématiques (hommes ou femmes) et leur enlevant toute chance d'être admis de nouveau? Judith Maxwell (voir le site des « Réseaux canadiens de recherche en politiques publiques » à l'adresse <<www.cprn.org>>), a écrit de nombreux articles sur la nécessité d'habiliter les femmes au sein de l'économie fondée sur les connaissances. Cette question prend de l'importance à mesure que l'élaboration de réseaux de connaissances, la numérisation du savoir décrite par Heather Menzies de l'université Carleton, le télétravail, etc. transforment le milieu de travail, particulièrement dans le secteur des services.

Les déséquilibres entre les sexes – évidents dans les secteurs de la rémunération, de la représentation et de l'avancement – occupent depuis longtemps une place dans la conscience publique. Les efforts déployés en vue d'intégrer les femmes à la main-d'œuvre qualifiée ne datent pas d'hier, mais le processus est loin d'être terminé. Comparativement aux hommes, les femmes sont mal représentées dans les domaines des mathématiques et des sciences et ce, aussi bien dans les universités que sur le marché de l'emploi; et pourtant, les mesures prises en vue de corriger cette inégalité ont achoppé. Le Conseil canadien des ingénieurs professionnels rapporte, il est vrai, une augmentation du pourcentage de diplômes de premier cycle en génie accordés à des femmes, qui est passé de 11 p. 100 en 1986 à 19 p. 100 dix ans plus tard <<www.ccpe.ca/english/newsletter/winter96/PRESSWOM.htm>>. Cependant, si l'on tient compte de l'écart considérable qui existe encore, une augmentation de 8 p. 100 semble constituer une bien faible avance sur la voie de la représentation équivalente des sexes dans un secteur d'emplois hautement qualifiés.

On a tenté, dans le cadre de petits projets, de découvrir pourquoi les filles ont tendance à éviter les cours de mathématiques et de sciences dès leur jeune âge. On a mentionné, notamment, qu'il faudrait peut-être adopter un autre mode d'enseignement pour arriver à soutenir leur intérêt. GirlsAreIt! <<www.girlsareit.com>> est un programme qui vise à encourager les jeunes filles à s'intéresser à la technologie. Le projet, qui est opérationnel dans de nombreux centres canadiens, incite les jeunes filles à se familiariser avec les applications pratiques de la technologie dans le cadre de projets d'équipe axés sur la conception de sites Web.

Quelle est la relation entre les compétences et l'innovation?

On émet l'hypothèse que les employés hautement qualifiés sont les plus productifs et innovateurs. Est-ce vrai? (L'entreprise d'informatique mentionnée précédemment fait une distinction très nette entre le personnel hautement qualifié et l'élite professionnelle.) Les résultats préliminaires des recherches effectuées récemment en Colombie-Britannique par le Centre for Policy Research on Science and Technology <<www.cprost.sfu.ca>> portent à croire, et ce n'est pas étonnant, qu'il existe une corrélation entre le talent innovateur au sein d'une entreprise et la façon dont celle-ci gère ses employés hautement qualifiés et sa base de connaissances (qui est, évidemment, axée sur des personnes). Il est possible que les environnements qui stimulent l'innovation au sein d'une entreprise stimulent également le rendement et l'acquisition tacite de compétences parmi les employés.

Les compétences font partie du milieu innovateur – par conséquent, la formation et le recyclage devraient être intégrés aux politiques élaborées par les gouvernements en vue de stimuler l'innovation. Ces liens doivent être analysés en détail et dans différentes régions – l'environnement industriel du Québec et du Sud de l'Ontario est très différent de celui de l'Ouest et des provinces maritimes. En 1997, la Canadian Advanced Technology Alliance a mené un sondage visant à évaluer les facteurs qui incitent les personnes hautement qualifiées à travailler pour une entreprise et à y rester. D'après le sondage, en plus d'être influencés par les incitatifs financiers (tels que les allégements fiscaux et les régimes d'avantages sociaux), les travailleurs hautement qualifiés choisissent des sociétés qui font preuve d'entrepreneurship et d'innovation <<www.cata.ca/cata/news/kpmgpoll.htm>>. Le Comité consultatif spécial sur l'innovation du Conseil de l'emploi et de l'investissement de l'Ontario s'attache à créer une culture axée sur l'innovation en récompensant l'innovation chez les jeunes enfants et en formant les jeunes qui deviendront les futurs innovateurs. Cet organisme reconnaît que le changement culturel est tributaire d'une infrastructure solide. Si les universités, collèges, laboratoires et autres réseaux axés sur la technologie sont sous-financés, la capacité de promouvoir une culture fondée sur l'innovation est compromise. <<http://204.101.2.101/jobgrow/papers/innovat.html>>.

Conclusion : Conseils en matière de politique pour le Groupe d'experts

En bref, le projet visant à dresser un inventaire de conseils et de recommandations concernant les compétences au Canada a permis de dégager un certain nombre d'initiatives à l'intention du Groupe d'experts. Ces recommandations se rapportent à des obstacles précis qui nuisent au transfert des connaissances et des personnes entre les divers éléments du système national d'innovation – il y a sans doute d'autres sources d'obstruction. On espère, en transmettant ces questions au SNI, réaliser le souhait de l'OCDE, à savoir étudier les problèmes systémiques de la politique technologique. Les recommandations sont les suivantes :

- élaborer une politique relative aux rôles respectifs des établissements d'enseignement financés par le gouvernement et de la formation en cours d'emploi;

- cerner les facteurs qui influencent la rétention des travailleurs hautement qualifiés au Canada;

- préparer un sondage sur les recherches visant à déterminer pourquoi les jeunes filles abandonnent les cours de mathématiques au niveau secondaire et éventuellement rédiger une synthèse de ces recherches;

- examiner des options relatives aux cours de rattrapage et aux classes d'appoint en mathématiques, lesquelles permettraient de réduire le taux de décrochage parmi les étudiants inscrits dans des programmes de sciences et de génie au niveau postsecondaire;

- analyser les liens entre l'innovation au sein des entreprises et l'embauche et la gestion de travailleurs hautement spécialisés.

Advisory Council on Science and Technology
Conseil consultatif des sciences et de la technologie

SUPPORTING DOCUMENT
19

An Inventory of Relevant Public Policy Advice, Policies, and Programs

Prepared for the Expert Panel on Skills
by J. Adam Holbrook,
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June 1999

Canada

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Cat. No. C2-467/2000-8E-IN

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Advice, Analysis, Recommendations

Alberta Federation of Labour (1997). "Addressing the Jobs Crisis Through an Economic Development Strategy." Alberta (Analysis) http://www.afl.org/presentations/jobcrisis.html, 1999, February 18.

This brief addresses the very changes which employers in the new economy are demanding. Considering the changes sought by employers, this article highlights the following negative effects of these demands: high unemployment and underemployment, increasing numbers of involuntary part-time and term or contract employment, declining wage and benefit levels, increased job insecurity, forced early retirements and inadequate pensions are all consequences of the "new economy". This brief suggests shorter standard working hours, public training programs to prepare workers for the new economy, more full-time positions, and a publicly led economic development strategy to deal with the changing economy.

Alberta Science and Research Authority (ASRA) (1998). "A Strategy for Information and Communications Technology in Alberta: Thursday, November 12, 1998 to Saturday, January 01, 2000." Alberta (Recommendations) http://www.gov.ab.ca/sra/, 1999, February 21.

This is the premier government report outlining Alberta's strategy in dealing with the emergence of the information economy. Complete with current statistics and forecasts this report outlines where the Alberta government is and where it sees itself going. Currently, Alberta captures 0.3 to 0.4 percent share of the world's more than $2 trillion ICT market place, a market forecasted to grow globally at 9 percent annually for the next 10 to 15 years.

Recommendations for an ICT Strategy for Alberta: Invest in Education; Double the output of ICT graduates; retrain and recruit others; Increase awareness of ICT career possibilities; Develop the ICT Infrastructure; Ensure an open, fair, and competitive communications environment; Demonstrate government commitment to a pervasive ICT culture of use; Grow Investment in R&D; Create a globally competitive environment through world-class ICT R&D; Grow ICT Business; Facilitate commercialization in Alberta to grow ICT business. Please see Website for entire document and more specific details regarding these recommendations.

Applied Science Technologists and Technicians of British Columbia (ASTTBC) (1998, December). "Employment Standards for High Tech: Panel Makes Recommendations." BC (Analysis) http://www.asttbc.org/, 1999, February 21.

Earlier this year the BC Government formed a review committee to look at Employment Standards for High Technology Professionals. More than 100 submissions were received from employers, employees and other stakeholders in the high technology sector. ASTTBC presented ideas on how the high tech industry could increase its focus on worker skill sets and career development by employing ASTTBC-certified technologists and technicians. This would help

employers in both recruiting and keeping skilled workers. High tech Highlights (1996): 41,850 employed by high tech businesses in BC (about 3% of provincial workforce); 50% increase in number employed since 1990; $1.9 billion in wages/salaries; 5,728 high tech firms in BC generated $4.4 billion in revenue; GDP for high tech sector grew by 6.5% Vs 1% for overall economy These highlights are based on report on the high tech industry 1988 to1996 by BC Statistics and the Information, Science and Technology Agency.

Association of Canadian Community Colleges (1997, January). "Post-Secondary Education in the Knowledge Economy : ACCC Submission to the Senate subcommittee on Post-Secondary Education." Association of Canadian Community Colleges. (Recommendations) http://www.accc.ca/english/advocacy/gov_relations/pse-knowledge.economy.htm, March 12, 1999.

This organization sponsors projects some international development projects focusing on skills training in technology; they seem to support technology training within Canada as an exportable product. This document recommends that:

- under the auspices of Human Resources Development Canada, the federal government implement a scholarship program aimed specifically at encouraging young Canadians to enrol in studies for careers in science, technology and engineering.

- Human Resources Development Canada, in conjunction with the Council of Ministers of Education Canada, undertake a public awareness raising campaign aimed at youth which publicizes the potential of and need for careers for Canadians with scientific and technical education.

- the federal government implement a student debt relief plan based on post-graduation income.

- the Department of Finance work with adult educators, unions and employer groups to develop affordable mechanisms within the tax system that would facilitate and encourage investment in learning by the Canadian workforce.

- the federal government support the Council Of Ministers of Education, Canada in the development of a pilot project on credit transfer at the community college and technical institute level.

- the government of Canada develop new policies and programs, in addition to those supported by the Canadian International Development Agency, which contribute to the internationalization of Canada's colleges and institutes.

- the government of Canada strengthen its support for CIDA activities and programs which link higher education in Canada with counterpart institutions in developing countries.

Association of Canadian Community Colleges (1998, November). "Canada's Colleges and Institutes Chart the Course for the Learning Society." Association of Canadian Community Colleges. (Advice) http://www.accc.ca/english/index.htm, March 12, 1999.

This organization sponsors projects some international development projects focusing on skills training in technology; they seem to support technology training within Canada as an exportable product. The ACCC isolates numerous areas where federal government could provide protection for learning in Canada (including tax breaks, business/education partnerships, early childhood education, professional development re: information technologies, etc.).

Association of Universities and Colleges of Canada, Canadian Association of University Teachers, The National Consortium of Scientific and Educational Societies (1996, October 18). "Putting knowledge to work: Sustaining Canada as an innovative society." (Recommendations) http://www.aucc.ca/english/about/briefs/KWORK.htm, March 12, 1999.

This report offers a variety of recommendations to government, including start-up grants for young scholars interested in emerging fields, encouraging opportunities to explore firsthand research for graduate students, collaboration between private and government research sectors, forming community partnerships, enhancing commercialization of research, and supporting research and communications infrastructures.

Atlantic Canada Opportunities Agency (1997, July). "Prospects for Growing Knowledge-Based Industrial Clusters in Atlantic Canada." Nordicity Group. New Brunswick, Newfoundland, Nova Scotia, PEI (Analysis) http://www.acoa.ca/english/frameset_main.html, March 12, 1999. The Atlantic Canada Opportunities Agency (ACOA) is a federal government agency. Headquartered in the region, ACOA's goal is to improve the economy of Atlantic Canadian communities, through the successful development of business and job opportunities.

This study examines the Prospects for Growing Knowledge-Based Industrial Clusters in Atlantic Canada. Prepared for ACOA by Nordicity Group Ltd., this study provides profiles and characteristics of six industry clusters in different stages of development and from varying geographical perspectives within Atlantic Canada. The study provides useful insights into the phenomenon of industrial clustering in our region and strategic options to stimulate further development of industrial clusters, including aquaculture, information technology, medical and health management, and marine technology. Key topics addressed include management issues, linkages in industry and between industry and R&D institutions, financing, information technology and jurisdictional influences.

The study is presented in two sections: Part 1: Concepts, Analysis and Recommendations provides a description of industrial clustering, examines a range of issues associated with clustering in an Atlantic Canadian context and proposes strategic options for advancing cluster development in the region. Part 2: Six Cluster Profiles provides a detailed examination of three region-wide clusters and three clusters on a sub-regional basis. The role this report envisions for government is mainly focused on encouraging growth in knowledge-based economic clusters. The report also identifies "model" organizations under a variety of criteria.

ACOA has also conducted a survey of the biotechnology sector in Atlantic Canada; with the goal of identifying areas for small business opportunity and commercialization opportunities.

BC Federation of Labour (BCFL) (1998, Nov. 23). "Issues Affecting Education and Training In BC." BC (Analysis) http://www.bcfed.com/Conv/edrep98.htm#ISSUES, 1999, February 18.

This report outlines the BCTF's position regarding education and training in the province of BC The BCTF believes that the BC government has ensured equitable access to post secondary education through their announcement of tuition-free Adult Basic Education. The freeze on tuition fees accompanies improvements to the student loan and grants program and increased support of innovative programs such as Prior Learning Assessment and Recognition (PLAR). The adult-tuition freeze is designed to provide basic skills that will enable adult workers to begin the process of life long learning. The report also lauds the spending priorities of the BC government in areas of k-12 education.

Biotechnology Human Resources Group (1996, May). "Building Long Term Capability Now: Canadian Human Resources Study in Biotechnology (The Paget Report)." The Paget Group. (Advice) http://www.bhrc.ca/long-term.html, February 10, 1999.

Fulfilling the potential of the Canadian biotechnology industry to create jobs and exports depends on the availability of educated, skilled and experienced people at all levels in companies. To realize these goals, the Steering Committee recommends initiation of a wide ranging human resources strategy for the industry that includes the following elements:

- A co-operative approach to strategic immigration to acquire skills not available in Canada, involving the industry, Citizenship and Immigration Canada and Human Resources Development Canada.

- A regionally focused training strategy to pool resources of firms in regional biotech clusters and to make the best available training affordable for companies of all sizes. Training in areas such as technology management and functional specialities, as well as advanced technician training are seen as being particularly crucial.

- Stronger strategic and operational relationships between the biotechnology industry and academic and research organizations.

- A co-operative approach, involving the industry and federal government, to developing personnel in the regulatory and intellectual property fields, so as to reduce the costs and increase the effectiveness of these processes. Joint training, benchmarking of the best practices in other jurisdictions and exchanges of personnel are among the activities envisaged.

- Partnerships with the educational system to improve general awareness of biotechnology and increase the level of academic attention to the field in the school system.

- Creation of a Biotechnology Sectoral Human Resources Council to develop and implement the agenda set out in this report.

British Columbia Labour Force Development Board (1995, November). "Training for What?" BC (Recommendations) not available online, February 18, 1999.

The BC Labour Force Development Board was created to provide a BC perspective on future skill needs and to advise on provincial skills development and training priorities. In this report, the Board addressed 3 main questions:

1. Where will work be in the future?
2. What skills will be required for this work? and
3. How can BC best organize its learning system to meet these skills needs?

The Board made recommendations in 6 areas:

1. Implementing an industry-led workforce development strategy.
2. Responding to Diverse Needs of Learners and Workers.
3. Ensuring Greater Relevance for Publicly-Funded Education and Training.
4. More Effectively Using the Resources of the Entire Learning System.
5. Improving the Efficiency and Effectiveness of Publicly-Funded Sectors of the Learning System.
6. Improving Accountability of the Publicly-Funded Sectors of the Learning System.

C.D. Howe Institute (1997, February). "Ending the Training Tangle: The Case against Federal-Provincial Programs under EI." Boessenkool, K. J. and W. B. P. Robson. (Advice) http://www.cdhowe.org/eng/pub/frame.html, March 12, 1999.

This report argues that EI supported training programs have done little to change the situation for most workers; it further suggests that local-provincial governments should handle training programs, and the freed up federal resources could be used to cut EI premiums.

C.D. Howe Institute (1998, October). "Canadian Human Capital Transfers: The United States and Beyond." DeVoretz, D. and S. A. Laryea. (Analysis) http://www.cdhowe.org/eng/pub/frame.html, March 12, 1999.

This article comes from a "brain-drain" perspective, considering the push and pull factors that influence highly skilled Canadians' decisions to seek work in the US.

Canadian Advanced Technology Alliance (1997, June 4). "Information Technology Skills Shortage Survey: Preliminary Results." (Analysis) http://www.technogate.com/skillsurvey.htm, March 12, 1999.

The published findings of this survey provide some analysis of perceived skills shortages and the various ways industry is attempting to address them. The greatest critical skill need identified is programming ability. The survey found that many companies were more likely to turn to offshore workers than to provide in-house training programs for their existing staff complement. Of those companies that do provide assistance, most of these aim at youth education (internship, scholarship, job shadowing) and one-time equipment provisions.

Canadian Advanced Technology Alliance (1997, June 11). "KPMG / CATA Alliance High Tech Labour Survey: High Turnover Risk a Yellow Flag for Canada's knowledge based economy." (Analysis) http://www.cata.ca/cata/news/kpmgpoll.htm, March 12, 1999.

KPMG and the CATA Alliance conducted a joint Survey on the key factors considered by high tech skilled workers when deciding on which company to join and what companies need to emphasize in order to retain valued employees. The Survey, conducted over the internet, attracted more than 1200 respondents in advanced technology sectors such as software, hardware, telecommunications and high tech consulting in Canada, the U.S. and several other countries.

The Survey showed, among other findings, that 73 percent of respondents were at best indifferent to their current jobs, with only 27 percent saying that they were very satisfied. Dissatisfaction was strongest among younger employees. Eighteen motivating factors were assessed, including, salary, benefits package, training and development, job security, exposure to new technology, community characteristics, among others.

"Governments as well as employers will also have to meet the challenge in advancing a climate for high tech growth. Increasingly, high-tech workers will want to select countries to work in that have competitive personal tax rates, and will want to work for employers who provide attractive employee options and ownership programs, and exhibit the values of entrepreneurship and innovation.".

Canadian Advanced Technology Alliance (1998, February 18). "Double the Pipeline." Ontario (Recommendations) http://www.cata.ca:22/pub/pipeline.wpd, February 10, 1999. (from the proposal)

Purpose: A proposal to the Ontario government to form a joint government/industry/education coalition that would "Double the Pipeline" of knowledge workers for Ontario high technology industries by doubling the enrolment in Computing Science, Computing Engineering and Electrical Engineering programs.

Proposed Immediate Action: The Government of Ontario should provide a fund where post-secondary educators and the high technology industry coalitions can leverage their measurable investments aimed at doubling the enrolment in Computing Science, Computing Engineering and Electrical Engineering programs. CATA has developed a draft proposal that could be used as a starting point. Starting in September '98, a minimum goal of an additional 2000 students per year could be educated with government capacity-building investment of <$7.5M in 1998 A total $55.7M investment over 4 years leveraging $239M from industry.

Canadian Advanced Technology Association (1998, February 18). "Double or Nothing: High-Tech Group Challenges Queen's Park to Double the Pipeline of Knowledge Workers in Ontario." (Recommendations) http://www.cata.ca/cata/news/double.htm, 1999, February 21.

Canada's leading high-tech Association, CATA challenged the Ontario government to work with industry to "Double the Pipeline" of IT professional workers by doubling the enrolment of computing science, computing engineering and electrical engineering university programs. The venue was the Ontario Government's Pre-Budget consultations held today at Queen's Park. According to CATA's President, John Reid, "Ontario will need more than 56,000 new professional I.T. workers over the next five years, while only producing 14,000 graduates, leaving a 42,000 shortfall. These jobs can and should be filled by Ontario youth. Reid added " In 1996, 7000 of the more than 9900 Ontario students who were not successful in attaining one of the 2745 universities spots provide an immediate pool of talent that could be educated/trained to fill these high paying jobs.".

Canadian Advanced Technology Association (1997, June 4). "Information Technology Skills Shortage Survey Preliminary Results CATA/Angus Reid Group." (Analysis) http://www.cata.ca/cata/news/skillsurvey.htm, 1999, February 21.

This article is an extremely important resource regarding the skills shortage in Canada. It provides detailed statistical information regarding the current skills shortage in Canada, as well as statistics detailing the skills needed and the impact of off shore workers.

(from the article)
Programming ability is the critical skill set need in the advanced technology sector. 67% of companies need programmers, 29% need systems analysts, a quarter (26%) require database analysts and 16% need to hire coders. 18% need a MIS position filled. Increasingly,

management of advanced technology work is an issue. While many of the basic skills such as programming/coding and database design/analysis are needed, management of information technology and systems is a crucial set of needed skills. Very few companies feel that offshore advanced technology workers are better in quality to that found in Canada. A majority feels that the quality of offshore workers is equal (40%) or worse (10%) than Canadian quality. Just over a quarter (28%) had no experience and could not answer the question. Of those companies that had some experience with offshore workers, almost four in ten (38%) currently employ offshore advanced technology workers. Given the shortage of skills, it is not surprising that a majority of Canadian companies would be willing to turn to offshore workers to fill the gap.

Canadian Advanced Technology Association (1998, Oct. 5). "CATA Alliance Advances Growth Agenda for a Knowledge-Based Canada." (Recommendations) http://www.cata.ca/cata/news/stdcommittee.html, 1999, February 21.

At hearings of the Standing Committee on Finance and in a submission to the CRTC, the CATA Alliance continued its campaign to advance an agenda to stimulate the growth of Canada's advanced technology industries. CATA Alliance focused on three main policy areas: Reduction of personal income taxes as rapidly as possible, beginning by eliminating the surtaxes, thus making Canada a more attractive place to work Expansion of R&D support through the SR&ED tax credit, the granting councils, Technology Partnerships Canada and the Space Program as the stimulus for creating a knowledge-based economy Avoidance of unnecessary regulation or any tax whatsoever on e-commerce/Internet/ an industry that by some estimates may exceed US$1 trillion by 2005.

Canadian Advanced Technology Association (1997, June 11). "High Turnover Risk a Yellow Flag for Canada's Knowledge Based Economy: KPMG/CATA Alliance High Tech Labour Survey." (Analysis/Advice) http://www.cata.ca/cata/news/kpmgpoll.htm, 1999, February 21.
Analysis:

KPMG and the CATA Alliance released today the details of a joint Survey on the key factors considered by high tech skilled workers when deciding on which company to join and what companies need to emphasize in order to retain valued employees. The Survey showed, among other findings, that 73 percent of respondents were at best indifferent to their current jobs, with only 27 percent saying that they were very satisfied. Dissatisfaction was strongest among younger employees. Eighteen motivating factors were assessed, including, salary, benefits package, training and development, job security, exposure to new technology, community characteristics, among others.

Advice: Governments as well as employers will have to meet the challenge in advancing a climate for high tech growth. Increasingly, high-tech workers will want to select countries to work in that have competitive personal tax rates, and will want to work for employers who provide attractive employee options and ownership programs, and exhibit the values of entrepreneurship and innovation.

Canadian Advanced Technology Association (1998, Dec. 3). "CRTC New Media Proceeding." (Advice) http://www.cata.ca/cata/advocacy/crtc.html, 1999, February 21.

CATA members' initial response when the CRTC Internet intervention proceedings were announced in July was to express extreme concern that CRTC wanted to regulate the Internet. They view regulation as something which would be extremely damaging to Canada's position in the burgeoning world of the global Internet. Anything which interferes with the pace of technological change, prescribes Canadian content, or raises costs handicaps Canada in the race for success on the Internet. CATA member's greatest fear is that the CRTC will decide to tax the Internet. Content providers have suggested a scheme similar to that which prevails in broadcasting, a 5% tax on ISPs' revenues which would go into a fund for the development of Canadian content. That would raise the cost of access for everyone doing business on the Net. A tax on the Internet will effect the fastest growing part of the economy. It will be a further competitive handicap.

Canadian Autoworkers Union (n.d.). "Work Reorganization: Responding to Lean Production." (Analysis) http://www.caw.ca/policy/cawlean.html, 1999, February 21.

This policy statement (May 1993) is in response to the introduction of new techniques in the management of production and human resources in the auto sector. The new production system (at time of publication) is called "lean production" and it has changed manufacturing on a worldwide basis. Lean production has emerged as one management's top models for changing workplaces and work practices. Traditional workplaces are "robust," relying on buffers of all kinds, including the following: inventory, space, large rework areas, banks between operations, and extra workers. The objectives of lean production aim to strip away these buffers, reduce costs and involve workers in the efforts to do so.

The CAW would like to see the process of "lean production" countered by a more democratic workplace with more worker involvement and control and better working conditions. Good job design, a focus on the pace of work, production standards, the content of job and ergonomics, the placement of injured and disabled workers, deepening the skills workers have, more say over technological change and more training would provide for broader worker development and would promote progressive workplace change.

Canadian Autoworkers Union (n.d.). "CAW Statement on Ontario Apprenticeship Reform." (Advice) http://www.caw.ca/departmts/apprent.html, 1999, February 21.

The CAW is concerned that the Ontario provincial government's recent report on changes to the apprentice training system promotes deregulation and shifts more power to employers and more of the burden onto individual workers. This shift results in cuts to training expenditures and abandons the province's commitment to workplace based training.

The CAW has long argued that the system needs to be adapted to better meet the needs of apprentices, to overcome companies own shortsightedness, to strengthen the industrial base in the country and to upgrade skilled occupational groups.

Canadian Autoworkers Union (1998, Nov. 16). "Brief to the Hearings on Bill 55: An Act to Revise the Trades Qualification and Apprenticeship Act." (Analysis) http://www.caw.ca/bill55/acttorevise.html, 1999, February 21.

The CAW believes that Bill 55 eliminates the following: ratios of journey persons-to-apprentices; time guarantees for apprenticeship programs; and regulated wage minimums for apprentices. In addition it the CAW believes that Bill 55: encourages short-term, limited training programs; removes apprenticeship standards; puts at risk employee health and consumer safety by abandoning certified trades; and, it shifts the costs of training to individual apprentices.

The system needs to be adapted to better meet the needs of apprentices, to overcome some companies own short-sightedness, to strengthen the industrial base in the country and to upgrade skilled occupational groups. But that doesn't mean a complete gutting of the policy, the legislation, the funding, the regulations and the delivery of apprenticeship in Ontario.

Canadian Autoworkers Union (1998, September). "The Harris Government and Jobs in Ontario: Another Look." Ontario (Recommendations) http://www.caw.ca/briefs/harrisjobs.html, 1999, February 21.

This report is a critical analysis of job creation and the economic health in Ontario under the Mike Harris government. The report suggests ways for government to further promote the creation of new jobs in vital sectors of Ontario's economy, from a union perspective.

Recommendations: Reduce interest rates, rebuild public spending, start to regulate capital markets, reduce working hours.

Canadian Council of Professional Engineers (1996, December). "University Engineering Programs Attracting More Women." (Analysis) http://www.ccpe.ca/english/newsletter/winter96/PRESSWOM.htm, 1999, February 18.

Statistics on engineering enrolment in Canadian universities reveal that the proportion of women enrolled in 33 engineering schools across the country has risen steadily since 1986. The CCPE's statistical information branch, the Canadian Engineering Human Resources Board, has released preliminary enrolment figures for 1996 which show that women currently make up 18 percent of undergraduate enrolment in accredited engineering programs, a 7 percentage point increase since 1986. The number of undergraduate engineering degrees awarded is up 8 percentage points (11% in 1986 to 19% in 1996) over the same period. At the graduate level, figures show an increase from 8 percent in 1986 to 17 percent in 1996.

Engineering schools which have attracted the largest number of female students include Guelph University, McGill University and Queen's University, each with over 25 percent of their respective undergraduate student population made up of women.

Canadian Council of Professional Engineers (n.d.). "Students Pursuing Wider Academic Options In New Industry Sectors." (Analysis) http://www.ccpe.ca/english/newsletter/winter98/comm_e.html, 1999, February 18.

According to a recent Enrolment Report of Canadian Council of Professional Engineers the face of Canadian engineering is changing quickly. The report studies engineering enrolment & degrees awarded from 1992-1996. Highlights include the following: Enrolment in university engineering programs is up 2% over 1995 levels; there have been major enrolment increases in computer, environmental and biosystems engineering; there has been a 8.5% increase in number of degrees awarded to women; the 20-year trend continues; In response to industry demands for more qualified and experienced graduates, cooperative and internship programs are becoming more popular as universities and employers recognize the value of student work experience.

Canadian Council of Technicians and Technologists (CCTT) (1997). "The National Labour Market Survey Results." (Analysis) http://www.cctt.ca/Secondarypages/TCsum98.htm, 1999, February 21.

In the spring of 1997, a labour market survey of technicians and technologists was carried out by Goss Gilroy Inc. for CCTT and its provincial constituent member associations. The survey captured information on issues such as demographics, employment characteristics, and education and skills. This is the first national picture of certified technicians and technologists since 1990. Below is an excerpt from the survey.

The following list profiles the nature of the post-secondary degrees, etc. obtained by technicians and technologists in technology-related disciplines. As indicated in this exhibit (excluding combined degrees), approximately 84% of technicians and technologists have a college diploma, while approximately 19% have a certificate of apprenticeship. Nature of degree and % with: College diploma—83.8%: Certificate of Apprenticeship—18.8%; Bachelor's degree—3.9%; Master's degree—0.9%; Other—9.2% (figures do not add up to 100% due to certain individuals obtaining more than one degree).

Canadian Labour Congress (n.d.) "Technological and Structural Change." (Analysis) http://www.clc-ctc.ca/policy/future3.html, 1999, February 18. According to this report a major "structural" culprit for the jobs crisis is technological change.

The argument is that the new information based technologies and new forms of work organization are labour displacing. The key point is that technological and organizational change, combined with intensifying international competition, has tended to erode "good jobs" in high productivity growth, capital intensive parts of the private sector such as resources,

manufacturing, transportation, communications and utilities. In the current North American context, and increasingly in Europe, many of those displaced, plus new entrants to the labour force, have had to find generally much worse jobs in the low productivity, labour intensive, "bad jobs" parts of the private services sector.

Canadian Labour Congress (1998, February). "CLC President Demands Jobs Now!" (Advice) http://www.clc-ctc.ca/publications/archive/98-feb-20.html, 1999, February 18.

The first national labour conference on job creation "Jobs Now! Making the 'new economy' work for people", registered more than 400 participants from across the country. The three day conference, held in Ottawa, focused on what the CLC president called "the decade long job crisis". In his speech White outlined a multi-faceted approach to job creation, underscoring the need for the federal government to set annual job targets, instruct the Bank of Canada to put job creation first, and to "pursue those targets with the same single-minded vigour shown in the pursuit of deficit and inflation targets.".

Canadian Labour Congress (n.d.). "The Future of Jobs—A Labour Perspective." (Analysis) http://www.clc-ctc.ca/policy/futurejo.html, 1999, February 18.

This report deals with the high and rising insecurity which working people face in the new economy and the widespread concern over the massive growth of temporary, insecure and badly paid jobs. This article tackles, among other issues: the unemployment rate, the fall of real wages, and the current state of youth unemployment. Regarding young workers the report states: " The plunging participation rate of young people is often soothingly explained in terms of increased enrolment in post secondary education, which is valid to a degree. But this view ignores the fact that a very high proportion of students do in fact work, or want to work, on at least a part-time or temporary basis. The fact that even the official youth unemployment rate today stands at 16%, despite the considerable shrinkage in the proportion of young people looking for work, is testimony to the marginalization of a large part of a generation.

Canadian Labour Congress (n.d.). "The Labour Market Now and In The Future." (Recommendations) http://www.clc-ctc.ca/policy/future2.html, 1999, February 18.

Today, 20% of men and 7% of women usually work more than 50 hours per week. The incidence of such very long hours has increased by about one half for men, and has doubled for women, since the early 1980s. In short, those fortunate enough to have regular, full-time jobs have often had to put in longer and longer hours. There has been a significant polarization of the labour force in terms of access to regular hours of work, with recent job growth, particularly for women, being disproportionately in "non-standard" forms of work i.e. part-time and temporary jobs and self-employment.

Recommendation: The introduction of shorter standardized working hours through legislation.

Canadian Labour Congress (n.d.). "The Current Policy Debate and The Implications for Labour Market Policies." (Advice) http://www.clc-ctc.ca/policy/future4.html, 1999, February 18.

A recent OECD and IOL World Employment Report argues that the advanced industrial countries have faced a major "adjustment problem" arising from the globalization of trade and investment, and from pervasive technological and organizational change. Both argue that the economies of the advanced industrial countries must retain and create high pay, high skill jobs by becoming highly productive, and by specializing in the production of sophisticated goods and services for global markets.

Advice: Increase speed of labour market adjustment to technological change and globalization, foster better employment security for workers which promotes firm investment in training; bolster income security for workers which will force firms to compete more on the basis of innovation than on the basis of low labour costs; and promote that high levels of co-operation between business and labour which contributes to higher productivity and the successful implementation of new technology and new forms of work organization.

Canadian Labour Congress (1998, June). "Education Ministers Get Failing Grade." (Recommendations) http://www.clc-ctc.ca/publications/archive/98-june-5.html, 1999, February 18.

A joint statement by the CLC along with several other organizations concerned about education has given both the federal and provincial governments a failing grade for dodging their obligations to provide quality education for all Canadians. The issues they address include: too many children are being denied access to early childhood education; too many school programs only exist if parents pay user fees, fund raise, or the school finds a corporate partner; skyrocketing costs of college and university education; and workers have no access to training.

Besides the CLC, the Canadian Federation of Students, the Canadian Teachers' Federation, the Canadian Association of University Teachers, Québec public and university teachers and the National Anti-Poverty Organization, are calling on governments to restore full funding, to stop commercialization of education, freeze tuition fees and eliminate all user fees in public education.

Canadian Labour Force Development Board, National Apprenticeship Committee (1997, April). "Apprenticeship in Transition." (Recommendations) http://www.clfdb.ca/english/library/a-appren.htm, Mar. 18/99.

The Canadian Labour Force Development Board (CLFDB) is an independent organization established in 1991 and made up of partners from business, labour, education and training, and the equity groups to play a leadership role on training and labour development issues.

The introduction of new technologies in the workplace requires changes in apprenticeship programs. Apprenticeships programs can also provide a valuable alternative route to employment

for youth who do not continue onto post-secondary education. This report recommends the development of a national apprenticeship strategy with national standards. This strategy must be developed in partnership with industry. The strategy must be consistent with new provincial/federal labour market programming agreements, meet the needs of a diverse range of both employers and students and provide adequate supports to ensure equity of access and financial assistance.

Canadian Labour Force Development Board, Task Force on Transition into Employment (1994, April). "Putting the pieces together: Toward a coherent transition system for Canada's labour force." (Recommendations) http://www.clfdb.ca/english/library/a-pieces.htm, Mar. 18/99.

The Canadian Labour Force Development Board (CLFDB) created the Task Force on Transition into Employment in 1992 to deal with policy and program issues surrounding the transition of people who are unemployed or not in the workforce into paid employment.

The Task Force recommends a national and coherent transition system that, among other things, incorporates mechanisms to assess and provide basic skills need to work and learn in present and future environment, and, which has a built-in capacity to cope with change to allow the transition process to adapt to changing circumstances and to the occupations of the future. The Task Force made recommendations in seven areas: (i) Labour market information; (ii) Income support and other support services; (iii) Education; (iv) Training; (v) Career and Employment Counselling; (vi) Prior learning and skills assessment; and (vii) Labour market practices. The Task Force argued for clearer communication and articulation of needs by all elements in the system in order to achieve a better fit between employee skills and employer needs.

Canadian Policy Research Networks (1997). "The Information Highway: Its Implications for Women and Work." Maxwell, J. (Advice) http://www.cprn.org/jmaxwell/files/spihi_e.htm, March 12, 1999. (from the text--speech by Judith Maxwell, President)

Governments have an important influence through the decisions that they make with respect to investments in training and education, the way income is redistributed, and the way in which labour markets are regulated. Employers, unions, and workers have a major impact on the future of work through the way in which they reinvent the rules of the workplace. Will work be shared among the insiders and outsiders, or will strict distinctions be maintained? Will education leaders begin to rethink the way they organize to deal with the challenges of technology? One of the poorest school boards in Ontario has dealt with the cost problem by creating one super classroom with the best technologies which is used by all the schools in the system. Kids travel by bus 5 or 6 times a year to spend a full day doing highly relevant games and exercises on the computer.

Are there ways to reduce the insecurity of the people in non-standard jobs? For example, could they establish basic rights, that is, opportunities to create solidarity with their fellow workers -- in dealings with employers as well as with suppliers. Can they form mutual aid societies to buy insurance? Or will temporary agencies begin to establish employment benefits for the workers

they deploy? Will political parties and governments begin to use technology as a means of democratization, fostering political participation, educating citizens, giving them voice, connecting people to the collectivity in which they live?

At the moment, we all tend to deal with employment and technology issues in an ad hoc fashion, often trying to minimize change rather than reach out for new answers that fit the new world of work.

Canadian Policy Research Networks (1998, December). "Human Resource Development and Planning in the Canadian Software Sector." Davidman, K. (Analysis) http://www.cprn.org/back_press/infhrd_e.htm, March 12, 1999.

The description of the software HRDP (human resources development and planning) system in this paper is examined in several sections:

Section II provides a brief history of the development of the software sector, followed by a discussion of definitional and measurement issues.

Section III makes use of the available data on the sector to provide a labour market profile. This covers employment levels, the nature of the employment opportunities and contracts, income, the skills required in the profession, the demographic profile of workers, and the reported shortage of workers to meet industry needs. This section provides the contextual backdrop for an examination of the HRDP system in the following section.

Section IV examines the key components of the HRDP system in the software sector: the education and training system that feeds workers into the sector at both the initial stages and through continuous learning, as well as the role of employers in attracting and retaining software workers.

Two main points about the HRDP system emerge. First, there are number of existing and potential problem areas within the HRDP system in the software sector, around issues of the training provided by the education and training system, the capacity of educational institutions, the quality of career guidance provided to students, unemployed and self-employed contract workers, and the practices of firms in attracting and retaining workers. The lack of adequate labour market information and signals within the sector is one of the major culprits. Second, the stakeholders associated with the various components of the HRDP system have been coming together through stakeholder networks such as the Software Human Resources Council and regional development bodies to pool their respective resources towards solving problem areas within the HRDP system. As a result, many new developments are underway that hold the potential to bring about improvements to the system.

Canadian Policy Research Networks (1997). "The Social Consequences of Knowledge-Based Growth." Maxwell, J. (Advice) http://www.cprn.org/jmaxwell/works_e.htm, March 12, 1999. (from the text of the speech)

1. In a knowledge-based economy, human capital is a dominant force. Employers and policy makers are forced to widen their focus to embrace both the market and the household because there are huge feedback effects between work and family in a world where nearly 70 percent of the population over 15 and under 65 is in the work force. This is a fundamental change from the industrial era, when the connections between work and family were invisible and easily ignored.

2. The notion of dynamic economic growth lengthens our time frames, and makes us think about path dependency. Learning curves matter in both personal and corporate life. Human capital is built over time. Early childhood experience shapes the adult. Individuals and firms are remarkably adaptable, but it takes time.

3. We have begun to uncover a new conception of health and well being. In Biblical times, illness was associated with sin. Look what happened to poor Job -- until he repented. In the industrial era, illness was associated with germs, genetics etc. In the post-industrial world, illness is often associated with stress, lack of control, poverty, and hopelessness. Organizational design and workplace policies are therefore going through a transformation.

These linkages between social and economic outcomes have created a whole new set of demands on researchers and on governments. To make good decisions, we need to know the outcomes from the investments/interventions that corporations and governments make. In addition, governments have to be able to show what outcomes they have achieved, if they are to rebuild the trust of citizens. What does this mean for public policy? We now have to plan for post-deficit Canada. The big issue of the next five years is not whether to cut taxes or pay down the debt. The big issue is whether we know where to invest the hard-earned dollars from the economic expansion now underway. Yes we must begin to pay down the debt, but we must also begin to address the social deficits which afflict so many Canadians. For these social deficits are a drag on our long-term growth. They impair our human capital and they depreciate our social capital. The even bigger challenge for researchers, statisticians, and policy analysts will be to help governments assess how big the social deficits are in 1997, as input to the decisions on social and economic investment priorities. This will be the essential policy road map for post-deficit Canada.

Canadian Policy Research Networks (1998, July 7). "Barriers to Employer-Sponsored Training in Canada." Betcherman, G., N. Leckie, et al. (Analysis) http://www.cprn.org/back_press/infbes_e.htm, March 12, 1999. (from the abstract)

This paper considers the question of what barriers employers face in investing in employee training. These barriers, which we will also refer to (interchangeably) as obstacles or

disincentives, may or may not be overcome or disregarded by the firm. In our view, the appropriate way to consider the question of barriers is within the context of a decision that the firm faces about whether or not to make a training investment. Sometimes a barrier will be a factor of enough significance to lead to a "no-investment" decision; other times, it may alter the nature or level of the investment; at still other times, it may be a consideration for the firm but ultimately not have an impact on the eventual investment decision. Given this perspective, then, "disincentives" probably most closely describe the concept at the heart of this paper.

For governments, the ultimate concern is whether disincentives may be leading to a sub-optimal (from a social returns point-of-view) level and composition of investment. Unfortunately, the information base is not up to the task of directly addressing this question of under-investment and, as a consequence, policy-makers must focus on understanding what the disincentives are and their importance.

Canadian Policy Research Networks (1997, June). "Developing Skills in the Canadian Workplace, The Results of the Ekos Workplace Training Survey." Betcherman, G., N. Leckie, et al. (Advice) http://www.cprn.org/back_press/bsee_e.htm, March 12, 1999. Policy Implications (From the overview)

One of the key conclusions reached by the authors is that the fact that some types of firms do not engage in workplace training in any meaningful way might well be a very rational response to the environment in which they operate. For some firms, training at least in the formal sense may not, in fact, be the best use of resources.

However, the authors note that there are two key segments of the economy that should be sources of concern from a public policy perspective. The first is small firms that face a significant cost disadvantage with respect to the provision of training. Small firms are also less likely to know about relevant training opportunities or to work with other firms and the educational sector to provide training. The second consists of individuals who lack access to training opportunities. This group includes not only those in the "non-training" segment of industry but also those who, because of their personal or labour force characteristics, tend not to be given training, despite being employed by organizations that do provide some training. Notable groups who are missing out are youth and non-standard workers.

To address the needs of these groups, Betcherman, Leckie and McMullen identify some potentially useful policy measures. One approach, for example, is to facilitate the development of networks that can provide supports for training to small firms and build relationships in the business community. With respect to individuals, they note the important roles played by cost and lack of information in hindering individuals in investing in their own skills development. Tools that could assist individuals include financial assistance measures such as income-contingent loans for investments in job-related training and improving access to information that will allow individuals to identify and assess appropriate training providers.

Canadian Policy Research Networks (1997, January). "Skill and Employment Effects of Computer-Based Technological Change: The Results of the Working with Technology Survey III." McMullen, K. (Analysis) http://www.cprn.org/back_press/bsee_e.htm, March 12, 1999. (from the abstract)

While the majority of respondents reported providing training when putting computer-based technologies in place, the training tended to focus on software applications and skilled technical employees. Other adjustment measures include hiring, employee transfers, and out-sourcing/contracting out. Establishments experiencing large increases in skill requirements relating to know-how tended to use both hiring and employee transfers as a means of adjustment more than establishments reporting little change on this skill dimension.

A key conclusion is that the on-going deepening of use of computer-based technologies within organizations is resulting in a transformation of the skills structure and in a widespread process of upskilling of jobs through both an occupational shift to high-skill jobs and an increase in skill requirements, especially for know-how, that is evident across the occupational spectrum. As a result, employment opportunities are disappearing for intermediate and unskilled workers in many sectors, notably those that are intensive users of computer-based technologies. Further, unskilled workers are not being provided with the skills to move into the newly created positions. When introducing or expanding computer systems, employers focus on up-grading the skills of technical workers.

That means the labour market will have to continue to absorb displaced workers who lack the skills and qualifications needed in a computer-based economy. For many, that will mean a shift to other industry sectors that continue to employ large percentages of low-skill, and often, low-wage, workers. But the Working with Technology Survey evidence suggests that even many of these jobs may disappear as traditionally low-wage sectors move toward greater use of computers in the workplace. To definitively answer that question, a larger survey that is representative of the full industrial, regional, and size composition of Canadian business is needed.

Canadian Policy Research Networks (1998, February). "Impact of Information and Communication Technologies on Work and Employment in Canada." Betcherman, G. and K. McMullen. (Analysis) http://www.cprn.org/back_press/infiit_e.htm, March 12, 1999. (from the abstract)

While the research community has not come up with all of the answers, there is a growing body of analysis that is trying to come to grips empirically with the diffusion of ICT and its various employment effects. In this paper, we review the Canadian evidence on four related issues:

- The diffusion of ICT. Various surveys have tracked the diffusion of computer-based technologies in Canadian workplaces through the 1980s and 1990s. In the next section, we summarize the trends over time, documenting the increased rates of adoption in terms of both breadth and depth.

- ICT and organizational change. The adoption of these technologies has led many establishments to rethink existing organizational strategies, structures, and practices. In fact, as we will argue in section 3, it is these joint forces of technological and organizational change, and not the technologies by themselves, that are driving the significant changes in employment and the nature of the work.

- ICT effects on labour demand. In section 4, we turn to the key question of the impacts of ICT on employment. Research on the effects on both (1) aggregate employment levels and (2) the composition of employment will be reviewed. As we will see, evidence relating to aggregate employment effects is very partial and inconclusive. However, the compositional effect seems clearer with most of the analysis pointing to the conclusion that the diffusion of ICT is shifting labour demand to more skilled workers.

- Distributional effects of ICT. We argue in section 5 that ICT is contributing to making earnings distributions more unequal. The shift in labour demand is one factor. As well, training activities sparked by the technologies have been concentrated on the already skilled. It is no surprise, then, that Canadian workers with a lot of human capital tend to see ICT as an opportunity while those without the skills are more likely to see it as a threat.

In the final section, we turn to human resource policy issues. ICT and the flexible organizations and institutions that accompany it are very much at the centre of a new economic paradigm which is forcing governments to rethink traditional approaches to human resource policy. On a variety of counts, longstanding policy strategies seem increasingly ill fitted to the emerging realities of the labour market which has implications for both productivity and growth and for distributional issues. Education and training must be a priority but the ways in which these are delivered undoubtedly will have to change considerably. However, policy-makers must also address changes in the nature of the employment contract and the basis of economic security, both of which have been fundamentally altered by the interdependent forces of technological and organizational change.

Centre for Labour and Management Studies (1998). "Information Technology, Human Resources and the High Performance Workplace." Giallonardo, N. BC (Analysis) http://clams.ubc.ca/, 1999, February 21.

This paper discusses the link between information technology (IT), human resources (HR) and high performance workplaces, focusing on how the HR function can use information technology to achieve high performance cultures. Although there are many applications of information technology that will help HR professionals to successfully perform their multiple roles, only four are discussed in this paper. These four types of information technology are workflow automation, human resource information systems (HRIS), intranets and groupware. Detailed information concerning these types of information technology is not provided in this paper, although key issues pertaining to the implementation of IT in organizations are discussed.

Communication, Energy, and Paperworkers Union (CEP) (1994, November). "Reduction of Working Time: CEP Convention, November, 1994." (Analysis) http://www.cep.ca/en/policies/worktime.htm, 1999, February 18.

The CEP argues for shorter working hours for today's workers. They argue shorter hours will have the obvious benefits of health and safety, increased job satisfaction, increased time for family and leisure, and the creation of new jobs. This addresses the supply side of skilled workers, as with shorter hours more people can be trained and employed in respective sectors, increasing the pool of workers.

The CEP is currently lobbying the provincial and federal governments to adopt legislation to reduce standard working hours.

Conference Board of Canada (1998). "Workplace Literacy: Best Practices Reader." Ontario (Advice) http://www2.conferenceboard.ca/nbec/, January 22, 1999. Profiles of 26 exemplary workplace literacy programs. Highlights the benefits to business and to employees.

Conference Board of Canada (1995). "Linking Teachers, Science, Technology and Research: Business and Education Collaborations that Work. Report 144-95." Souque, J.-P. Ontario (Advice) http://www2.conferenceboard.ca/nbec/pdf/r144-95.pdf, January 22, 1999.

This Conference Board report highlight a series of business and education collaborations designed to link teachers, science, technology and research. The report shows that business and education have been successful in developing innovative collaborations that connect teachers with science in industry. Business-supported teacher internship programs motivate teachers to teach science, raise awareness of the skills needed for careers in S&T, introduce relevance in the curriculum, and promote teacher awareness of how technology can be used to improve learning.

Conference Board of Canada, National Business and Education Centre (n.d.). "Benefits of Employee Involvement in Business-Education Partnerships." Ontario (Advice) http://www2.conferenceboard.ca/nbec/, Mar. 31, 1999.

This Conference Board of Canada report focuses on the benefits of employee involvement in business-education partnerships. The report discusses how business-education partnerships provide significant benefits to employers by improving the employability skills of employees. These include positive effects on communication skills, the ability to think critically and logically and attitudes towards work.

Conference Board of Canada, National Business and Education Centre (1998). "100 Business-Education Partnerships: 1998 Idea Book." Ontario (Advice) http://www2.conferenceboard.ca/nbec/, January 22, 1999.

Profiles winners of a national competition for business-education partnerships. To qualify, national partnerships had to demonstrate success in at least one of the following: promoting or fostering employability skills, science, technology and/or math literacy; entrepreneurship; teacher development and enhancement; encouraging students to stay in school; expanding vocational, technical and/or apprenticeship training; integrating in-class and on-the-job workplace experience; and raising awareness of the role each stakeholder plays in enhancing the quality of learning.

Conference Board of Canada, National Business and Education Centre. (n.d.). "Employability Skills Profile." Ontario (Analysis) http://www2.conferenceboard.ca/nbec/, January 22, 1999.

Employability skills are the critical skills required in the Canadian workplace. **Academic skills** provide the basic foundation to get, keep and progress on a job and to achieve the best results. These include the ability to *communicate*, *think* critically and logically and *learn* for life. **Personal Management Skills** include *positive attitudes and behaviours, responsibility* and *adaptability*. **Teamwork Skills** are required to work with others on a job and achieve the best results.

Conference Board of Canada, The Business and Education Forum on Science, Technology and Mathematics (n.d.). "Science Literacy for the World of Work." Ontario (Advice) http://www2.conferenceboard.ca/nbec/, January 22, 1999.

Science Literacy for the World of Work is compatible with the Employability Skills Profile which addresses foundation skills. Science Literacy for the World of Work identifies competencies specific to science, technology and mathematics. **A Sound Footing** provide the foundation to use science, technology and mathematics as a way of knowing, communicating and making decisions. These include attitudes and behaviours, critical-thinking and communication skills. **A basic understanding** comprises the competencies needed to understand how science, technology and mathematics are used in the world of work—key concepts, numeracy and health, safety and environment issues. **An ability to apply** includes the competencies needed to make science, technology and mathematics work for you. Problem solving, participating in projects independently or as part of a team and effective use of information technology are all-important competencies.

Environment Canada (1996, March). "Environment Canada's Science and Technology: Leading to Solutions." (Advice) http://www.ec.gc.ca/SciencePol/homepg.html,

This report suggests seven principles for S&T, as follows:

- Increasing the effectiveness of federally supported research and training
- Capturing the benefits of partnership (with universities & private sector, with levels of gov't, with industry)

- Emphasizing preventive approaches and sustainable development
- Adopting policies, practices and regulatory approaches that encourage innovation
- Extending information networks - the infrastructure of the knowledge economy
- Strengthening international S&T linkages
- Promoting a stronger science culture.

Federal Partners in Technology Transfer (1997, Fall). "Incubating Technology: Best Practices." Kumar, U. and V. Kumar. (Analysis) http://scitech.gc.ca/fptt/kumar.html#2, March 12, 1999. (from the description)

The objective of this research project is to develop a better understanding of the best practices of incubating new technology-based firms. Specifically, the following questions will be explored:

What is the role played by technology incubators with shared facilities, government laboratories, universities, technology corporations, and entrepreneurial networks and associations in incubating new technology-based firms? What are the key dimensions of the process of incubation instituted at these organizations?

What factor(s) distinguish successful incubating efforts from the not so successful ones at each of these organizations? What lessons can be learned, i.e., what are their best practices for technology incubation?

Implicit in the above issues are whether the incubator with shared facilities is still the most effective way of incubation; and how the alternatives advanced by federal laboratories, universities, technology corporations, and entrepreneurial networks and associations support incubation activities. In addition, the study discusses the question of how incubating technology contributes to the strengthening of our national system of innovation.

This study provides multiple examples of best practices encountered in the course of its research. In general, the researchers focus on industry initiatives to support research and innovation.

Fraser Institute (n.d.). "High Tax Rates Make Canada an Unattractive Place to Work." Kesselman, J. BC (Advice) http://www.fraserinstitute.ca/forum/1998/july/taxation.html, 1999, February 23.

This article focuses on the 1998 federal budget and how it cut income tax rates for all taxpayers except those at upper incomes. The authors believe that high tax rates on upper incomes further discourages the location and expansion of business in Canada as opposed to lower-taxed locales and that Canada has become less attractive to potential immigrants with special skills, business acumen, and high wealth.

According to the authors, cuts to higher income tax rates must become a priority for the next federal budget. Such cuts can be justified to improve incentives, enhance economic efficiency, and augment job creation. They believe high tax rates on upper incomes further discourage the location and expansion of business in Canada as opposed to lower-taxed locales and that Canada has become less attractive to potential immigrants with special skills, business acumen, and high wealth.

Fraser Institute (n.d.). "The Brain Drain or Gain?" DeVoretz, D. BC (Analysis) http://www.fraserinstitute.ca/forum/1999/january/drain.html, 1999, February 23.

This article tackles many of the general issues regarding the phenomenon known as Brain Drain. The article attempts to answer the following questions: "Is this much ado about nothing? Is it media hype? Do the numbers, albeit modest, justify the sobriquet "brain drain"? Does this skilled outflow indicate a fundamental disequilibrium in the Canadian labour market? Is Canada losing its competitive edge in high-tech industries because of our tax structure, slow job growth, ill-conceived educational policies, or perhaps for all of these reasons? Please see Longer Abstract for Further detail.

Fraser Institute (n.d.). "Is There a Youth Unemployment Crisis in Canada?" Law, M. and F. Mihlar. BC (Analysis) http://www.fraserinstitute.ca/forum/1998/february/study_release.html, 1999, February 23.

This article attacks the notion that there is a youth unemployment crisis in Canada. The authors state that this problem is 'perception' only. While youth related and labour market issues have taken centre stage in discussions on public policy and possible remedies for the alleged crisis figure prominently in current policy, the authors maintain that the claim that there is a youth unemployment crisis in Canada has escaped careful scrutiny. Accordingly, their analysis of national unemployment rate data suggests that youth unemployment is not a significantly larger problem today than it was in the past.

This article advises that: "At an aggregate level, the best solution to youth unemployment is a strong macroeconomic climate and a flexible labour market.

Fraser Institute (n.d.). "The Brain Drain and Fiscal Policy: An Open Letter to Paul Martin." Grubel, H. BC (Advice) http://www.fraserinstitute.ca/forum/1998/may/spending.html, 1999, February 23. (from the letter)

Dear Minister:
Congratulations on balancing the budget, lowering program spending, and underestimating future surpluses to keep at bay the big spenders in your cabinet. Unfortunately, however, your budget is bad for Canada in one respect. By not lowering taxes on high-income earners, you sustain the brain drain. Canada needs highly skilled and innovative entrepreneurs. It is your

responsibility to create the economic and tax environment that will keep them here, which you could have done by lowering tax rates on capital gains and top income earners. You could still have balanced the budget by making other spending initiatives just a little smaller.

Fraser Institute (n.d.). "Government-Sponsored Training Programs are not a Solution for Unemployed Canadians." Mihlar, F. and M. D. Smith. BC (Analysis) http://www.fraserinstitute.ca/forum/1998/january/release.html, 1999, February 23.

This article questions the notion that government-sponsored training programs are a panacea for improving the economic prospects of disadvantaged workers in Canada. According to the article the federal and provincial governments already spend billions of dollars on theses programs and plan to increase spending over the next 5 years.

The article poses the following question: "Are government-sponsored training programs a viable way to improve the employment and earnings prospects of unskilled and disadvantaged workers?" According to a recent study by The Fraser Institute the answer to this question is a definite "No." Entitled "Government-Sponsored Training Programs: Failure in the United States, Lessons for Canada", the authors of the study review evidence from the US and conclude that government-sponsored training programs have been largely unsuccessful in their efforts to reduce unemployment, increase earnings, and reduce welfare dependency among poor single parents, disadvantaged adults, and out-of-school youth.

Fraser Institute (1999, January). "Brain Drain Cuts Our Tax Take Too." Stewart-Patterson, D. BC (Advice) http://www.fraserinstitute.ca/forum/1999/january/tax.html, 1999, February 23.

This article provides analysis of the Brain Drain phenomenon from the perspective of the Canadian tax system. The article stresses the impact that high taxes have on driving highly educated Canadians out of Canada. The article provides recent statistics on taxes paid and lost as a result of Brain Drain and it points to the costly public training and educational investment which is lost when Canadians leave for the U.S.

The article advises a restructuring of the tax burden for this group of Canadian workers.

Gender and Sustainable Development (1998). "Workplace Reform." BC (Recommendations) http://www.sdri.ubc.ca/gender/index.html, 1999, February 21.

Considering that basic values and quality of life are often sacrificed under present economic structures such as the 9-to-5 workday, which is not designed to benefit people, and that learning is a life-long process this organization recommends: shorter and more flexible hours of work, job sharing, telecommuting on a regular or periodic basis, training and education programs, structured and planned leaves of absence, ensuring that people have meaningful work in qualitative sectors such as education, health, care, ecological restoration, and the arts, and that the work of volunteers in these sectors be as equally valued as the work of paid staff.

Government of Canada (1998). "The Relevance of Education to the World of Work, with a Focus on Youth Employment." (Recommendations) http://www.cmec.ca/nafored/english/accc.stm,

This document was coordinated by Association of Canadian Community Colleges. The document focuses on youth and discusses employability skills, and critical skills, but does not list what they are. They also point out that there is no national consensus as to what employability skills and critical skills are, and that a national consensus should be reached. There were three recommendations made:

1. The promotion of a Stakeholders' Social Contract on Education, to be used as a blueprint for further discussions on the roles and responsibilities of all stakeholders, leading to the endorsement of a national responsibility and accountability framework for youth programs in Canada.

2. The creation of a national coordinating body to oversee the development and implementation of a pan-Canadian strategy, supported by all levels of government, business, labour, and the education sector to;

3. Ensure that the topic of Relevance of Education to the World of Work, with a Focus on Youth Employment is maintained as a regular and permanent item on the national education agenda.

Human Resources Development Canada (1998). "Updating Essential Skills for the Workplace." Federal (Advice) http://www.cmec.ca/nafored/english/hrdc.stm, "Gradually improving the K-12 and Postsecondary education (PSE) systems alone will not eliminate the need for essential skills updating. In the new economy, essential skills training will be an ongoing requirement. This is due to continuous workplace change and the fact that essential skills acquired during childhood may weaken if not used in daily activities. ".

Human Resources Development Canada (1998). "A Primer on Skill Shortages in Canada." Roy, R., H. Henson, et al. (Advice) http://www.hrdc-drhc.gc.ca/arb/publications/research/skills.shtml, March 12, 1999.

Training workers for jobs that are deemed to be in shortage is often seen by governments as a way of making the economy work better. Implementing such a policy necessitates, among the many other things, the prior identification of current and future skill shortages. Unfortunately, because of a lack of understanding of the economic meaning of a shortage, discussions around this topic often obscure the analysis of the problems, their causes and their solutions. There is a need for an introduction, a guided review of the literature and an overview of the empirical evidence for Canada. This primer tries to fill these gaps. It provides an introduction to the notion of skill shortage. It reviews the more general concept of imbalance in the labour market, investigates how skill imbalances are measured, reports on the existing evidence of such imbalances in Canada, and discusses some of the public policy issues.

Human Resources Development Canada (1998). "Technological Change through Knowledge Workers - The Case of Recently Graduated Engineers." (Analysis) http://hrdc-drhc.gc.ca/stratpol/arb/publications/bulletin/vol4n1/v4n1c04e.shtml, March 12, 1999.

This bulletin presents a summary of a study conducted by Lavoie and Finnie (cited elsewhere in this inventory). In their study, The Accumulation of Technology: A Cross-Cohort Longitudinal Analysis of Recent Engineering Graduates, the authors used information from the National Graduates Survey to examine the work experience of engineering graduates who received their degrees in 1982, 1986 and 1990. Information concerning the 1982 and 1986 graduates was available for two periods-two years and five years following graduation. For the 1990 graduates, only information for two years after graduation was available at the time of the study.

The researchers paint a sunny picture of job satisfaction among young Canadian engineers. What is perhaps most useful from this study is the research tool devised to measure job education-skill match of graduates.

Human Resources Development Canada, Applied Research Branch (1997, November). "Is It Worth Doing a Science or Technology Degree in Canada? Empirical Evidence and Policy Implications." Lavoie, M. and R. Finnie. (Analysis) http://www.hrdc-drhc.gc.ca/arb/publications/research/skills.shtml, March 12, 1999.

This paper looks at the early careers of science and technology graduates in Canada using three waves of the National Graduates Surveys. Employment rates, earnings levels, job satisfaction, the job-education skill match, and the overall evaluation of the education programme are studied in order to evaluate the attractiveness of careers in science and technology and the degree to which these graduates' skills and talents are being efficiently utilised. We find that computer science and health graduates have generally done very well; that engineers have performed in a solid, although not spectacular, fashion; and that pure and especially applied science graduates have lagged behind, especially at the undergraduate level. The implications of these findings for the accumulation of the science and technology knowledge bases in Canada in the context of the emerging "knowledge-based economy" are discussed.

Human Resources Development Canada, Applied Research Branch (1998, June). "Employment in the Knowledge-Based Economy: A Growth Accounting Exercise for Canada." Lavoie, M. and R. Roy. (Analysis) http://www.hrdc-drhc.gc.ca/arb/publications/research/skills.shtml, March 12, 1999. (from the description)

Questions arise as to the magnitude of the trend toward highly skilled workers, the pace at which it is occurring and the reasons why it is happening. Over the last quarter century or so, we find that the current patterns of employment favouring this category of workers have evolved quite rapidly overall and in a widespread manner across industrial sectors but not uniformly from one occupational sub-category to another. This is due, in large part, to the critical role of information and communication technologies in the increasing trend toward the codification of knowledge. The process of codification, which helps facilitate the diffusion of knowledge, making it less

costly and more rapid, tends to reduce the need for routine jobs. At the same time these technologies generate a new complexity and drive the research process at the frontiers of knowledge. In order to understand the causes of the new labour market trends, we examine the relative sources of the change in the structure of employment using a decomposition analysis in which we include three factors - substitution, labour productivity lag and final demand.

Human Resources Development Canada, Applied Research Branch, Strategic Policy (1996, October). "Technological and Organizational Change and Labour Demand: The Canadian Situation." (Advice) http://www.hrdc-drhc.gc.ca/arb/publications/research/abr-97-1e.shtml, March 12, 1999.

This report explores recent Canadian evidence of technological change and organizational change and their impact on firms and workers. Adoption of new technologies, particularly computer-based technologies (CBT) and advanced manufacturing technologies (AMT) has become widespread. About 45 per cent of establishments have adopted some form of CBT and 88 per cent of manufacturing shipments were produced by some combination of AMT. Nearly half of the Canadian workforce now uses computers on the job. It is becoming clear that firms adopting CBT and labour-enhancing AMT show employment growth in high skill, high wage categories; such firms also eliminate some low skill, low wage jobs. These sorts of changes are considered by some to underlie a trend increase in market income inequality in Canada. It is also thought that widespread adoption of new technology and organizational changes underlies the trend increase in "non-standard" employment relations, viz, part-time, short-tenure, self-employed and contract work. Policy must aim at maximizing the benefits of technological change for firms, workers and consumers while at the same time monitoring and controlling its social costs. Three broad policy directions are suggested: fostering innovative workplaces, enhancing human capital development and supporting workers in a changing environment.

Humanities and Social Sciences Federation of Canada (1998, October). "Closing the Gap: Investing in Knowledge for a Better Canada. A brief submitted to the House of Commons Standing Committee on Finance." Association of Universities and Colleges of Canada, The Canadian Consortium for Research, et al. (Recommendations) http://www.hssfc.ca/English.html, March 12, 1999. (main recommendations from the report)

We urge the federal government to make significant additional investments in university research over the next five years to ensure that university researchers have access to internationally competitive levels of support. More specifically, we recommend that the federal government:

- correct its under-investment in social sciences and humanities research by doubling the budget of SSHRC. This will enable the council to make the targeted investments needed to close the knowledge gaps in key policy areas, promote focused graduate training in new settings and nurture the research base;

- commit to a multi-year plan to invest significant resources in the Canadian Institutes for Health Research. The CIHR proposal is an innovative approach to funding health research across a broad spectrum of disciplines;

- progressively increase the budget of NSERC by 50% to help the council respond to the new research opportunities opened by the CFI and ease the transition to a knowledge-based society by supplying a steady stream of new ideas and training the highly skilled people required to complete this transition; and

- double current investments in the Networks of Centres of Excellence program.

- we urge the government to review its intramural scientific activities to determine whether the ability to meet mandates has been excessively compromised and to explore possibilities for improved performance through structural changes and other means.

Humanities and Social Sciences Federation of Canada (1997, September). "Sustaining Canada as an Innovative Society: An Action Agenda." Association of Universities and Colleges of Canada, Canadian Association of University Teachers, et al. (Advice) http://www.hssfc.ca/English.html, March 12, 1999. (From the report)

To safeguard Canada's ability to innovate, we propose an action agenda that builds on the enhanced research capacity generated by the Canadian Foundation for Innovation and the renewal of the NCEs. Sustaining Canada as an innovative society now requires feeding the innovation process by ensuring that all sectors of Canadian society have access to a steady stream of new ideas and highly skilled people. We therefore recommend that the government make strategic investments through the granting councils directed at three critical areas: investing in people; enhancing current efforts in knowledge and technology transfer; and, giving a greater international orientation to our research effort by strengthening foreign area studies and international research collaborations... R&D is an area of strategic investment for the federal government. We are nonetheless cognizant of the fact that the federal government is unwavering in its resolve to eliminate the deficit and reduce the national debt. It is for this reason that we propose a modest and progressive strategy geared at enhancing our capability to produce knowledge in order to capitalize on our newly-created potential to produce and transfer knowledge.

Industry Canada (1996, December). "Employment Performance in the Knowledge-Based Economy." Gera, S. and P. Massé. (Analysis) http://strategis.ic.gc.ca/SSG/ra01285e.html, March 12, 1999.

The study examines the relationship between structural change and the employment performance of the Canadian economy over the period 1971 to 1991, using Statistics Canada's input/output model. Though largely based on previous work by the OECD (I 992), the study employs more timely data and a finer industrial disaggregation (I I I industries as opposed to 33), and explores more closely the employment implications of the emergence of the knowledge-based economy. Three policy-related issues are addressed in the paper:

1.Is the employment structure in Canada shifting towards innovative industries - i.e., knowledge-intensive, technology-intensive, science-based, skill-intensive, or high-wage industries?

2.What are the factors driving these shifts? What have been the respective roles of domestic demand, trade, technology, and productivity?

3.How are labour markets adjusting to the new demands of the knowledge-based economy?

Major Findings

- As in other OECD economies, Canada has seen progressively weaker overall employment growth in recent decades and a relative shift in employment away from the sectors - the primary, manufacturing, and construction industries - to the service sector.
- Contrary to popular belief, the pace of structural change in Canada has not been quickening.
- Employment growth in Canada is increasingly related to the use and production of knowledge. This transformation has been evident since the early 1970s.
- Although the direction of change has been towards knowledge- and technology-intensive industries, they still account for only a small share of over all employment in Canada.
- Employment in high-knowledge industries is less sensitive to cyclical downturns than that in medium- and low-knowledge sectors.
- While domestic demand and labour productivity growth have always been important determinants of employment growth, the role played by trade and technology increased during the 1980s and early 1990s.
- These demand-driven forces are accompanied by a shift in the structure of labour demand towards skilled workers.

Informetrica (1997, November). "Securing the future of Canadian youth: A review of the landscape. *Monthly Economic Review* 16 (6, 27)." Justus, M. and M. McCracken. Ontario (Advice) http://www.informetrica.com/prodserv/mer/mr1606m.htm, Mar. 31, 1999.

This report on the future of Canada's youth prepared by Informetrica outlines the unique labour market challenges facing youth today. The authors recommend the joint development by the federal and provincial governments of a national strategy for investing in Canada's young people through youth employment and post-secondary education capacities. In addition, they recommend dealing with rising tuition fees and student debt, the school-to-work transition, workplace training for disadvantaged youth and more employer investment in workplace training and entry level positions.

Institute for European Studies, University of British Columbia (1998, November). "Transition to the Knowledge Society: Policies and Strategies for Individual Participation and Learning Conference site." British Columbia (Analysis) http://www.ies.ubc.ca/events/transition/abst.html, March 12, 1999.

Conference themes include "Skills Development for the Knowledge-based Economy", to wit: It is widely accepted that the introduction of new technologies is changing the skills required in the economy. They not only lead to the creation of new types of jobs requiring new skills; they also change the skill content of existing jobs. The ability of workers to adapt to and take advantage of the new technologies therefore depends on their ability to acquire, develop and maintain the requisite skills throughout life. Given the amount of time over the life cycle which individuals spend working, the workplace is a key link in the learning chain and an area where policy is seen as having a key role in promoting lifelong learning. There is increasing evidence that successful, innovative firms place greater importance on human resources and on training, and that there is a positive association between firm performance and investment in workers. Nonetheless a minority of enterprises appear to be taking the investment-in-human-capital route to better performance. Moreover, participation in job-related training is uneven and tends to favour those that are employed and who already possess a large amount of human capital.

Institute for Research on Public Policy (1997-1999). "Policies for a Knowledge-Based Economy." (Advice) http://www.irpp.org/research.html#knowledge, March 12, 1999.

This is a program designed to gather and execute analysis on policy issues relevant to the knowledge-based economy. Although it is still in initial stages, it is likely that the results of this effort will be available through an IRPP publication like Policy Options magazine.

(from the description)
Today's knowledge economies depend crucially upon human capital for their success, and it is therefore not surprising that human capital issues are high on the policy agendas of most governments. Human capital has been a common theme of recent work by IRPP in education, manpower training, family policy, and labour market policy. Now, the Institute is developing an exciting new programme of research aimed at contributing to one of the crucial policy challenges for Canada over the next few years, namely, devising a comprehensive and appropriate human capital investment strategy.

International Association of Machinists and Aerospace Workers (IAM) (1998, January-March). "The Growing Gap Between Those Who Can't Get Work and Those Who Work Too Much." Erlichman, L. (Advice) http://www.iamaw.org/canada/winter98/english/pg9.htm, 1999, February 18.

This article discusses the problem of part-time workers compared to overtime workers. The article discusses the benefits of reducing standard working hours to promote quality of life and to promote job creation and diversity.

Advice: The Federal government should promote the legislation of shorter standard working hours.

ITAP (1998, January). "Prince Edward Island Information Technology Staffing & Skills Survey." PEI (Analysis) http://www.itap.pe.ca/news/execsummary.htm, March 12, 1999. (from the report)

In December, 1997, the Information Technologies Association of Prince Edward Island (ITAP) contracted Focus Marketing Inc. of Charlottetown, Prince Edward Island to design and execute a survey of private sector companies in PEI identified as being either: a) engaged in the business of providing Information Technology (IT) products or services; or b) large users of IT products and services.

From this survey, the following findings are most relevant:

- Respondents anticipate rapid growth in staffing of an estimated 640 new, full-time equivalent positions in the next three years, or an estimated total of 1,220 full-time equivalent IT positions by the end of 2000 (see chart on next page).

- Respondents have experienced difficulty in recruiting higher skilled IT positions such as Software Development, Maintenance & Specialities and Multimedia Production, and anticipate that these recruitment challenges will continue.

- For the majority of respondents, post-secondary IT education is essential in the development of skilled and competent IT workers.

- In general terms, respondents believe that the education sector in Prince Edward Island is not doing an adequate job of supplying graduates with the skills sets needed. This is particularly notable in the higher skilled IT positions.

- With respect to future skill requirements, there appears to be a high degree of interest in Internet related skills including the design and maintenance of web-based technologies; network development and maintenance; database application development and management; and interpersonal skills enabling staff to effectively communicate and interact with clients and co-workers.

- Respondents indicate strong potential support for internship and on-the-job-training programs. However, the small size of many Island businesses could potentially have a negative impact on the quality of these programs and the benefit to both the student and the employer. This is essentially due to both the financial and staff resources which must be committed to these programs.

- Potential barriers to the growth of private sector IT staffing in Prince Edward Island include a lack of local skilled resources; the small size of many Island IT businesses and departments; the need for, but shortage of, workers with three to five years experience; higher IT worker remuneration packages outside of Prince Edward Island; a lack of critical mass in the IT industry.

Learning and Working: Changing Patterns of School-Work Transition in Canada, University of Alberta (n.d.). "School-Work Transitions Changing Patterns and Research Needs: Discussion Paper Prepared for Applied Research Branch Human Resources Development Canada." Krahn, H. Alberta (Recommendations) http://www.ualberta.ca/~glowe/transition/swtrpt5.html, 1999, February 21.

This extremely detailed review of recent research on school-work transitions reveals a number of stable patterns concerning training and employment trends in Canada. The report clearly outlines significant areas of change, and answers a range of questions.

Suggestions for improving school work transitions include the following:

- increase mentoring programs in combination with other school-work transition initiatives;
- improve career counselling and job-placement programs;
- provide more school-business partnerships in which schools and local businesses share information and resources of various kinds;
- create additional school-based enterprises where students, under the supervision of teachers, operate businesses of various kinds;
- increase efforts to extend co-operative education programs that can provide meaningful on-the-job work experience for high school students;
- restructure high school academic programs to build much more relevant occupational and career-based learning into the academic high school curriculum;
- provide innovative youth apprenticeship programs that allow young people to apprentice while remaining in high school and obtaining a legitimate high school diploma.

Learning and Working: Changing Patterns of School-Work Transition in Canada, University of Alberta (n.d.). "Policy Responses to the Changing School: Work Transition: A Discussion Paper, Alberta Advanced Education and Career Development." Lowe, G. and H. Krahn. Alberta (Recommendations) http://www.ualberta.ca/~glowe/transition/swtrpt2.html, 1999, February 21.

This paper is an extremely detailed, critical examination, of a central assumption in the school-work public policy debate; namely that graduates are not finding suitable employment and, moreover, that there is a poor fit between outputs of the educational system and changing employer needs.

This paper provides numerous detailed recommendations including the following: Federal, Provincial, and local governments must promote actions such as co-op programs, job shadowing, school-business partnerships, and strengthened vocational programs.; the changing patterns of education, employment, family formation, and retirement behaviour require us to focus on the variety of "school-work transitions" rather than simply the "school-to-work transition"; governments, employers, schools, organized labour, and community groups all need to work together to develop useful SWT programs and policies; the programs should be custom-designed to match local school and employment situations (however, SWT policies at the provincial and federal level are still needed to encourage and coordinate such local initiatives).

Manitoba Education and Training (1997, March). "Report on High Demand Occupations and Skills in Manitoba." MB (Analysis) http://www.edu.gov.mb.ca/labour/hdo_home.html, Feb. 12/99. excerpt –

This report identifies occupations that are currently in high demand in Manitoba, and are expected to be in high demand over the next two years.

Manitoba Education and Training (n.d.). "Section 3: Employment Programs." MB (Analysis) http://www.edu.gov.mb.ca/inventory/section3.html, Feb. 10/99.

1.2 Trades and Technology Focus - Promote careers in trades and technical areas, particularly the Senior Years. Apprenticeship Option. Provides a wage incentive to employers to hire a high school student for a trade and technology career-related work experience.

3.1 Youth info.works provides a wage incentive to employers who can provide jobs in the information technology sector. Employers can also be reimbursed for training costs.

5.0 Winnipeg Development Agreement. Program 5D: Training in Emerging Growth Sectors such as aerospace, healthcare products, information and telecommunications, tourism, agrifood processing, transportation/distribution, and apparel manufacturing.

Manitoba Education, Research and Learning Information Networks (MERLIN); Special Operating Agency (SOA) (1988, April). "Council on Learning Technologies: Draft - Planning FrameWork for the Integration of Information Technologies in Manitoba's Education and Training System." MB (Analysis) http://colt.merlin.mb.ca/documents/PLANIN3.html, Feb. 12/99.

Mandate excerpt – The primary role of the Council is to provide advice to the Minister of Education and Training on policy issues and implementation decisions which will support the effective educational use of technology throughout the education and training sector.

Report excerpt - Technologies are rapidly becoming integrated into all aspects of educational activities...It is the belief of the Council on Learning Technologies that a provincial strategic plan for the integration of technologies into education and training is necessary, as well as a committed and partnered approach by schools, divisions, colleges, universities, government and communities, to its implementation. Without this, the integration of technologies in education and training will continue to be piecemeal, inequitable, and sometimes wasteful. This document is a draft of such a provincial strategic planning framework, developed under the sponsorship of the Council. The sections below outline the action frameworks which have been identified as necessary for the K - S4 school system, and for Manitoba's colleges and universities.

Manitoba Federation of Labour (MFL) (1997, December). "Brief to Government of Manitoba." MB (Analysis) http://www.mfl.mb.ca/, Feb. 12/99. excerpts:

Job Creation - The MFL has long been on record as urging the provincial government to redouble it efforts to formulate and implement an effective job creation strategy that produces full-time, fairly paid employment in safe and healthy working conditions... These measures can have an impact in the short term, but must be part of a long-term job strategy and not viewed in isolation.

Apprenticeship and Training - Currently, the Apprenticeship and Training track record in Manitoba and Canada is one of high quality, producing journeyed workers that are in demand. Unfortunately, the federal government has targeted its support for this program as an ideal place to make budget cuts in support of its war on debt and deficit. Our immediate concern is that apprenticeship training continue without added burden for apprentices.

Manitoba Information Network (1999, January 29). "Corporate Training on the Internet Booming." MB (Analysis) http://www.min.mb.ca/NextEd/newsletter.htm, Feb. 12/99. "Technology-based training systems have grown 40% annually in recent years," and analysts expect the trend to continue.

Manitoba Information Network (1998, November 27). "Back from Atlantic Canada." MB (Analysis) http://www.min.mb.ca/NextEd/newsletter/NextEd981127.htm, Feb. 12/99. excerpt :

Atlantic Canada Competitive Intelligence Survey sought out firms and governmental agencies that are building business in the education sector... Outside consultants were hired to identify local strengths, potential markets, and the match of the two.

Manitoba Innovation Network (1998, April). "Emerging Skills Needs Task Group." MB (Recommendations) http://www.eitc.mb.ca/, Feb. 12/99. excerpt :

Identifies key issues/problems, key reasons and recommendations... task group formed in the spring of 1997, in response to concerns raised by the Manitoba IT industry about the shortage of available IT workers, both in quantity and quality. The main recommendation was the formation of an Information Technology Sectoral Committee on Human Resources address the skills shortages issue in the sector, develop priorities and implement strategies to increase the quality and quantity of Manitoba IT talent.

Manitoba Innovation Network, Economic Innovation Technology Council (n.d.). "About EITC." MB (Recommendations) http://www.eitc.mb.ca/, Feb. 12/99.

EITC recently completed a study that addresses the issues of skills in the information technology sector. The main recommendation was the formation of an Information Technology Sectoral Committee on Human Resources to address the skills shortages issue in the sector, develop priorities and implement strategies to increase the quality and quantity of Manitoba IT talent. This committee was formed in September 1998 and consists of senior-level leaders from the Manitoba IT industry.

National Advisory Board on Science and Technology (NABST) (1995, April). "Healthy, Wealthy and Wise: A framework for an integrated federal science and technology strategy." (Recommendations)

The National Advisory Board on Science and Technology advised the Prime Minister on Canada's science and technology system. A fundamental finding of this report is than an effective federal mechanism is needed for identification and achievement of strategic national policy goals for S&T. The Board members emphasize the need to strengthen science education in Canada and "science culture." Among the most important critical skills needed today are entrepreneurial skills. Federal, provincial and local governments must work with industry and universities to develop leaders of the future with the required skills.

National Advisory Board on Science and Technology (NABST), Human Resource Development Committee (1991, April). "Learning to Win: Education, Training and National Prosperity." (Recommendations)

The National Advisory Board on Science and Technology advised the Prime Minister on Canada's science and technology system. In this report, NABST reviewed forty reports over the last 10 years as well as new information. Based on this information, the Committee members made a series of recommendations in five areas:

- public awareness of the competitive economic challenge;
- a national strategy for human resource development;
- new partnerships between education, business and labour;
- performance standards and curricula for basic literacy, numeracy and technological skills; and
- lifelong or continuous learning.

Natural Resources Canada (1995). "New Directions in Science and Technology." (Analysis) http://www.nrcan.gc.ca/dmo/spcb/newdir_e.html#400

Here, NRC describes the concentration on natural resources export in Canada and suggests the need to encourage value-added export (e.g. manufacturing). The report suggests many areas in which the Canadian government can support science and technology culture in Canada. The most relevant recommendations and strategies to the mandate of the Panel focus on early education to promote science and technology awareness, mechanisms to link forestry graduates with scientists and laboratories, linking federal and university laboratories, and utilizing Schoolnet to provide Canadian geographical databases and maps.

Natural Sciences and Engineering Research Council (1994). "Policies, People and Programs: Preparing for the Transition to a Knowledge-Based Economy." (Advice) http://www.nserc.ca/pubs/ropent.htm, March 4, 1999.

This report describes the recent history of NSERC's activities towards supporting Canadian R&D. The general Canadian neglect of R&D in favour of natural resource export is indicated as a major impediment to international competitiveness. NSERC sees its task as providing funding initiatives for students and researchers in science and engineering, towards maintaining and improving Canada's R&D community. This report makes a number of general recommendations, including linking federal and national resources; coordinating federal post-secondary education policies; promoting public awareness of issues related to S&T; human resources strategies; and science counsel to government.

NSERC also participated in collaborative efforts, including a Task Force on the Advancement of Knowledge described in this report. Recommendations of this task force include:

- that Canada needs a human resources strategy for science and engineering if it is to maintain its international competitiveness in science;
- that universities represent an invaluable network for bringing new knowledge to Canada through international collaboration;
- that the university research environment is the foundation of innovation, and must continue to receive adequate support;
- that fostering support for a science and engineering culture requires scientists to account for their public funding by reporting their discoveries to the public and by
- indicating how those discoveries will benefit society; and
- that government allocations for all S&T activities must be guided by two principles: that internationally recognized criteria must be used to identify scientific excellence; and that relevance is a legitimate and necessary guide to setting priorities.

Ontario Federation of Labour (n.d.). "Unions and the Information Highway." Ontario (Advice) http://www.ofl-fto.on.ca/library/index.htm, February 25, 1999.

The Ontario Federation of Labour [OFL] represents 650,000 workers in more than 1,500 affiliated local unions. In this paper, the OFL reviews the impact of the information highway for unions, in particular, they examine the elimination for the destruction of jobs through the use of information technology. The report argues: for education measures to help citizens acquire the necessary skills; new training and competency standards; an employer-supported training fund for workers laid off as a result of the information highway; and mandatory employer-sponsored retraining for workers affected by new technologies and processes.

Ontario Federation of Labour (1997). "Education: Towards Tomorrow." Ontario (Advice) http://www.ofl-fto.on.ca/library/index.htm, February 25, 1999.

The Ontario Federation of Labour [OFL] represents 650,000 workers in more than 1,500 affiliated local unions. This report argues that Ontario's school must make strategic investments to prepare students for knowledge society. A $1 billion annual Investment for Tomorrow Fund is recommended with the following components:

- $500 million Equal Opportunity Fund for the student population most at risk.
- $400 million Adapting to Change Fund to develop and implement curriculum to meet the new expectations.

- $100 million Infrastructure Fund to renovate existing schools so that the new teaching and learning technologies may be used in those schools.

Ontario Federation of Labour (1997, March). "Apprenticeship Reform Discussion Paper: Response of the Ontario Federation of Labour." Ontario (Advice) http://www.ofl-fto.on.ca/library/index.htm, February 25, 1999.

The Ontario Federation of Labour [OFL] represents 650,000 workers in more than 1,500 affiliated local unions. This paper was prepared in response to proposed changes to Ontario's apprenticeship system. The OFL argued against an apprenticeship system that depends solely on competency-based measures in the absence of time-based measures. A "competency-based" training that "assumes that all the skills needed by a trade have only to be identified, listed, and tested doesn't work because it fails to turn knowledge into skill.

The OFL also recommended compulsory certification, provincial government assistance to individuals in apprenticeship programs, a governance system and a central role for community colleges as delivery agents of in-school training.

Ontario Federation of Labour (1997). "An Alternative Vision of Postsecondary Education." Ontario (Advice) http://www.ofl-fto.on.ca/ftp/budppr6.txt, February 25, 1999.

The Ontario Federation of Labour [OFL] represents 650,000 workers in more than 1,500 affiliated local unions. In this report, the OFL disputes the Ontario Government's approach to post-secondary education as primarily to help meet employer and work force requirements. Instead, the OFL argues for a broader approach that recognizes that the broad range of options available to students, might actually be a better means for achieving the needs of industry and the private sector in the long term. In addition, universities and colleges also provides enhancements in the cultural and social life of the province and its citizens. The paper proceeds to outline a set of principles and discussion points for postsecondary education in Ontario, such as equity of access, restoration of funding levels and use of technology.

Ontario Jobs & Investment Board (1999, Mar. 25). "A Road Map to Prosperity: An Economic Plan for Jobs in the 21st Century." Ontario (Recommendations) http://www/ontario-canada.com/jobgrow, The Ontario Jobs and Investment Board was created up to develop a plan for jobs and economic growth.

Ontario Jobs and Investment Board, Special Advisory Panel on Innovation (1998, October). "Creating an Innovation Culture." Ontario (Advice) http://204.101.2.101/jobgrow/papers/innovat.html, Mar. 31, 1999.

The Ontario Jobs and Investment Board was created to develop a plan for jobs and economic growth. This report focuses on the challenge of creating an innovation culture. With respect to critical skills, this paper suggested that work needs to be considered in the following areas:

- Human Capital: shaping the future innovators in our youth; reward innovation
- Organizational & physical infrastructure: universities, colleges, laboratories, alliances & networks, technology.

Ontario Jobs and Investment Board, Special Advisory Panel on Preparing People for Tomorrow's Jobs (1998, October). "Preparing People for Tomorrow's Jobs." Ontario (Advice) http://204.101.2.101/jobgrow/papers/preppeop.html, Mar. 31, 1999.

The Ontario Jobs and Investment Board was created to develop a plan for jobs and economic growth. This report discusses important trends workforce development and jobs, such as: the need for different and higher skills; the growing need to retrain an ageing workforce; changing patterns of employment such as self-employment and frequent job transitions. The report identifies a need for a new regulatory environment that recognizes the characteristics of the changing workplace. Employers need flexible work arrangements to respond promptly to fluctuations in demand and competitive circumstances. Employees need workplace standards that are fair and help them balance work, training, family and other responsibilities.

Ontario, Ministry of Education and Training, Advisory Panel on Future Directions for Postsecondary Education (1996, December). "Excellence, Accessibility, Responsibility: Report of the Advisory Panel on Future Directions for Postsecondary Education." Smith, D. C. and e. al. Ontario (Advice) http://www.edu.gov.on.ca/eng/document/reports/futuree.html, Mar. 31, 1999.

The Advisory Council on Future Directions for Postsecondary Education was mandated to provide advice to Ontario's Minister of Education.

With respect to training, the Panel's members noted that while Ontario's workers are among the best educated in the world, maintaining this position will depend on Ontario's ability to maintain a good supply of highly-educated, skilled and flexible workers. Employees already in the workforce comprise a large and growing market of lifelong learners that offer the potential for Ontario's postsecondary institutions to expand their base of private sector support. To this end, the Panel recommended that colleges and universities explore more actively private and international training programs and partnerships with private institutions.

Ontario, Ministry of Energy, Science and Technology (1998, June). "Innovation Summits: Summary of Comments." Ontario (Advice)
http://www.est.gov.on.ca/english/st/st_innov_summits.html, Mar. 31, 1999.

During June 1998, the Ministry of Energy, Science and Technology conducted four regional Innovation Summit meetings as part of an ongoing consultation around what was needed to create an "Innovation Culture" in Ontario.

On developing an Innovation Culture, the overwhelming opinion was that the prime role of the government was to show "leadership" and be a "champion" for science and technology and to promote broader public awareness of the importance of science, technology and innovation to the economy, the creation of jobs and the well-being of all Ontarians. The problems faced by young researchers in obtaining financial support were considered a serious constraint to innovation. Additional government support for scholarships was proposed.

Ontario, Ministry of Energy, Science and Technology (1998, December 24). "Ontario Biotechnology Task Force Report." Ontario (Advice)
http://www.est.gov.on.ca/CFDOCS/biotech.pdf, Mar. 31, 1999.

The Ontario Biotechnology Task Force was mandated to develop a strategy to revitalize and accelerate the commercialization of biotechnology in Ontario.

This report presents a strategy to ensure Ontario's leadership in the biotechnology sector. Part of the strategy is concerned skills and human resource requirements. The lack of school co-op placement programs is identified as a key gap. Students who want to work in the biotechnology industry will need a range of skills including multidisciplinary training and exposure to industrial problems.

Parkland Institute, University of Alberta (1998, Spring). "Passing the Buck on Post-Secondary Education in Alberta." Barnetson, B. Alberta (Analysis)
http://www.ualberta.ca/~parkland/postv2n2a.html#SecEd, 1999, February 21.

The Alberta government likes to brag about fiscal responsibility. The irony is that the Alberta government's new approach to post-secondary education (PSE) seems to be lacking one crucial dimension: responsibility. Most obviously, there is the lack of responsibility for adequate funding. Alberta's post-secondary system lost 21% of its government funding between 1994 and 1997 as part of deficit-control measures. This loss, when coupled with spiralling enrolments and stagnant funding throughout the 1980s, has resulted in a 37% decline per-student since 1982 (real-dollar funding). Funding and enrolment projections suggest this pattern will hold through 2005. Besides cutting back funds, there has been a dramatic, yet covert withdrawal of responsibility for ensuring access to education.

Policy Research Initiative (1996, October). "Growth, Human Development and Social Cohesion." (Advice) http://policyresearch.schoolnet.ca/keydocs/oct96rep/oct96rep-e.htm, February 6, 1999.

The Policy Research Initiative (PRI) was launched in July 1996 by the Clerk of the Privy Council and Secretary to the Cabinet in office. The objective of the PRI is to build a solid foundation of horizontal research upon which future public policy decisions can be based. This report places the issues of skills and skills adjustment within the context of two key areas: innovation, technological and societal and overall human development with an emphasis on factors that can assist social cohesion.

The report recommends research in the following areas:

- For youth, we need a better understanding of the pattern of progression from school to precarious labour market status, to entry jobs, and to middle-level positions in the labour market, so as to remove the risk of permanent exclusion of a segment of the youth population (p.43).

- how to develop a culture of lifelong learning among individuals, firms and institutions. (p.180) What are the impediments to such a system and what is the relative role of each player? (220)

- analysis of the factors that impact on the ability of people to adapt rapidly to new economic and work environments.

- analysis of the performance of the Canadian education system in preparing young Canadians to working life and of work retraining programs (182)

- the changing nature of work, whether it is cyclical, permanent and its relationship to employers' strategic choices and competitive environment

- how innovative workplace practices create a high performance workplace.

Policy Research Initiative. Global Challenges and Opportunities Network (1997, February). "Canada 2005 - Global Challenges and Opportunities: Draft Interim Report." (Analysis) http://policyresearch.schoolnet.ca/keydocs/global/index-e.htm, February 6, 1999.

The Policy Research Initiative (PRI) was launched in July 1996 by the Clerk of the Privy Council and Secretary to the Cabinet in office. The objective of the PRI is to build a solid foundation of horizontal research upon which future public policy decisions can be based. This report examines, in part, the human development challenges of the knowledge-based society. Challenges for Canada are in (a) making the necessary investments to create effective lifelong learning systems that meet the needs of individuals and of national cultural goals and of global competitiveness, and (b) retaining our highly skilled workers.

Royal Commission on Learning (1994). "For the Love of Learning: Report of the Royal Commission on Learning." Ontario (Recommendations) http://www.edu.gov.on.ca/eng/general/abcs/rcom/main.html, Mar. 31, 1999.

The (Ontario) Royal Commission on Learning was asked to present a vision and action plan to guide Ontario's reform of elementary and secondary education in particular with respect to program needs, accountability and governance.

The Commission stressed the importance of instilling in students a love of learning to prepare them for a life of lifelong learning. One of the Royal Commission's key directions was to emphasize the use of computers and related technology to establish the relevance of formal schooling to the world outside of schools, and, with the help of teachers, to help young people learn in more creative, co-operative and sophisticated ways. Another important aspect of the Royal Commission's work concerned school to work and school to higher education transition. On this subject, the commissioners recommended more explicit identification by all stakeholders of knowledge and skill expectations.

Social Sciences and Humanities Research Council (1998, August). "The Employability of University Graduates in the Humanities, Social Sciences and Education: Recent statistical evidence." Allen, R. C. (Analysis) http://www.sshrc.ca/english/resnews/index.html, February 15, 1999.

The Social Sciences and Humanities Research Council is one of the three federal funding agencies for academic research. This report on the employability of university graduates in the humanities, social sciences and education was borne out of a concern with the proper balance between the specialized skills and generalized education, particularly a popular view that the social sciences and humanities are irrelevant to economic success in the new world economy.

Drawing upon a range of data, the author concludes that, in economic terms, social science, humanities and education programs are sound investment. Each of these university programs -- as well as those in engineering and science -- "yield a social rate of return that exceeds the real interest rate in Canada today. The return on humanities programs is almost identical to that of engineering, and social science and education programs are even more profitable".

Statistics Canada (1997, September). "A Dynamic Analysis of the Flows of Canadian Science and Technology Graduates into the Labour Market." Lavoie, M. and R. Finnie. (Analysis) http://www.statcan.ca/english/research/88F0006XIB/88F0006XIB98004/free.htm, March 12, 1999.

This document provides an analysis of the current state of matching skills to employment, and supply to demand, of human resources in S&T sectors. Reports on employment patterns and careers of scientists and engineers; also on the industrial stability of science and technology graduates. Variables used in the analysis include earnings, job satisfaction, job-education skills match.

UBC (n.d.). "Women and Science & Technology." BC (Analysis) http://www.sdri.ubc.ca/gender/AB_Live2.html#ABLiveSciTech, Feb. 12/99. excerpt: Franklin, U. 1992. The Real World of Technology. Toronto:

Anansi -- examines the social impact of technology, uncovering the ideas and practices embedded in technology. She argues that "prescriptive" technologies, especially since the Industrial Revolution, have bred a culture of compliance especially for labour, aided by the spread of control and management systems throughout government and industry. Communications technologies have altered our perception of reality and our political and social relations. This process includes our perception of nature. We now speak of "our environment", reflecting an androcentric view of the world where "our environment" is seen as yet another infrastructure for our technologies.

UBC (n.d.). "Women and Environment Industry." BC (Analysis) http://www.sdri.ubc.ca/gender/AB_Live1.html#ABLiveEnvInd, Feb. 12/99. excerpts:
· Armstrong, P., and Armstrong, H. 1992. "Sex and the professions in Canada." Journal of Canadian Studies. 27(1)

Armstrong first demonstrates that gender has played, and plays, an important organizing role in the membership in the 88 or so occupations (out of the over 500) which count as professional.... They then provide an impressive compilation of some of the lifestyle correlatives that attend such segregation (e.g., marriage, children).

T· Fouillard, A. 1993. Emerging trends and issues in Canada's Environmental Industry. Ottawa: National Round Table on the Environment and the Economy -- A good overview (unfortunately now outdated, as far as federal commitment is concerned) of the state of environmental industries in Canada... As with the concept of profession, definition is critical -- consider EIs properly, and one is able to reduce (as Ernst & Young did in the companion1992 Human resources in the environment industry) the numbers of women workers to under 10%, a composition that is found almost nowhere else in the labour force, and certainly not in environmental nongovernmental organizations.

University of Victoria (1997, October 14). "Sustainable Communities Initiative, Dept. of Economics." British Columbia (Advice) http://web.uvic.ca/sci/SCI00002.HTM,
"the local economy cannot be analyzed in isolation, but must be considered in the context of its relationship with its region, nation and the world....In the longer term the sustainability of the economic base is dependent upon the ability to adapt and innovate, which in turn depends on the communities general quality, particularly the quality of it human and environmental resources. "

Vancouver Centre of Excellence—Research on Immigration and Integration in the Metropolis (1998, October). "Canadian Human Capital Transfers: The USA and Beyond." DeVoretz, D. and S. A. Laryea. BC (Recommendations) http://www.riim.metropolis.globalx.net/, 1999, February 21.

During 1982 to 1996 almost 54,000 highly trained Canadians emigrated to the United States. This study documents the value of this Canadian transfer to the United States in several of the following areas: a major economic incentive to emigrate to the United States by employed highly trained Canadians was the educational taxpayer subsidy they received before leaving and the creation of a back door entry to the United States as a result of temporary worker provisions under the NAFTA accord. For the most contentious period 1989-1996 it is found that the replacement costs for the brain drain to the United States is estimated to be $12.6 for the 1989-96 period.

Recommendations: Mitigate this net outflow by reducing the educational subsidy to Canadian emigrants and develop a more selective immigration policy which reduces the replacement costs. In addition, a more careful match by Canadian universities to the Canadian supply and demand for highly skilled graduates could mitigate the outflow in the health sciences. Canadian immigration policies, which reduce settlement and certification problems, are fundamental to reducing the current brain drain. Prior assessment of language, educational credentials and job experience of highly skilled immigrants by potential employers would insure that the net economic value of skilled immigrants to Canada is again positive.

Western Research Network on Education and Training (1998, Fall). "Cohort Patterns in Canadian Earnings and the Skill-Biased Technical Change Hypothesis." Green, D. a. B., Paul. BC (Analysis) http://www.educ.ubc.ca/wrnet/newsl3.htm#Education and Recent Labour Market Developments, 1999, February 21.

This report deals with one of the dominant changes affecting North American labour markets— a technologically induced shift in demand towards more skilled workers and away from less skilled workers. It also deals with the earnings gap between younger and older workers which has increased substantially. A prime cause is "skill-biased technical change" where the skill in this case is not formal education but labour market experience. Older workers have more accumulated experience, and according to this view they benefit more from the increased premium placed on skills than their younger, less experienced counterparts. Other research highlighted in the report outlines how young workers entering the Canadian labour market in the 1980s and 1990s appear to receive lower real earnings than previous generations at the same age and educational attainment. In ongoing work, the authors are examining how differences between the US and Canada – in terms of capital accumulation, technological progress and educational attainments--can help explain the earnings patterns observed in Canada.

Western Research Network on Education and Training (1998, Fall). "The Push for Education Sector Performance Measures: A Summary of Ongoing Research." Gilbert, S. BC (Analysis) http://www.educ.ubc.ca/wrnet/newsl3.htm#Education and Recent Labour Market Developments, 1999, February 21.

This report deals with the identification of issues involved in the measurement of generic skills of students, and in judging the effectiveness of education programs. The "issues" section outlines the definition and meaning of generic skills and examines the conceptual, methodological and practical issues that need to be faced in assessing and measuring skills. The "inventory" paper provides detailed summaries of current attempts in Canada to measure the skills of students, graduates and employees using sample surveys and direct tests. Each summary description outlines the type of tool, target group, use or need met, skills assessed, methodology, overall results, detailed results, validity/reliability, administrative issues, reports produced and research contacts. Work has also been conducted on the correspondence, or lack of it, between the direct tests and self-reported assessments of skills.

The skills chapter highlights the use of reading, writing, numeracy, communication, learning and teamwork skills associated with various levels of education. The skills analysis, together with the observed employment and income outcomes for low education youth, raises the question that a key policy issue may be the plight of those with low education in an increasingly high education society.

Western Research Network on Education and Training, UBC (1998, Spring). "Policy Analysis Team Projects." BC (Analysis) http://www.educ.ubc.ca/wrnet/newsl1.htm#Labour Market Analysis Team Projects, 1999, February 21.

These projects explore the public policy aspects of the changing links between education and the economy. The research asks a number of questions, such as how particular policies emerge, where the questions that motivate policy-makers come from, and how policy-makers, institutions, and the general public interpret the problems being addressed, what outcomes matter to whom., and what counts as skill? Closely related to the discourse on educational outcomes is the issue of what education produces and what the economy looks for; that is, what counts as "skill"? In the policy analysis the report documents which intellectual, social, technical and personal factors count for whom and how their consequences impact on education and training policies.

Western Research Network on Education and Training, UBC (1997, September). "The Demand and Supply of Post Secondary Education in British Columbia." Allen, R. C. BC (Analysis) http://www.educ.ubc.ca/wrnet/wpseries.htm#97.03, 1999, February 21.

This paper compares the growth in demand for people with different educational credentials to the production of those credentials in British Columbia. In the 1990s, the growth in demand for completing trades has been about equal to provincial supply; however, the number of undergraduate university degrees and certificates awarded in B.C. has only been one third of the

number required by the growth of the BC economy. This shortfall has been met by the immigration of graduates from elsewhere in Canada. While BC is second only to Ontario in the fraction of its adult population with a university degree, it is last among all the provinces in the number of degrees awarded per resident aged 20-29. Currently, the report suggests that the present university policy of the provinces condemns many children who grow up outside of the big cities, to low paying service sector jobs.

Workfare Watch (1998, August 1). "Welfare Reform and the Labour Market: Are there enough jobs? Ontario Social Safety NetWork Backgrounder." Ontario (Analysis) http://www.welfarewatch.toronto.on.ca/wrkfrw/labmar.htm, Mar. 18/99.

Workfare Watch is a joint project of the Community Social Planning Council of Toronto and the Ontario Social Safety NetWork. It was established in 1996 to monitor and report on the implementation of workfare policies in Ontario and their impact.

The Ontario Works program (Bill 142) will not achieve its goal of reducing the welfare rolls since it ignores (among other things) the need for skills training and education. The barrier most commonly identified by welfare recipients to finding a job is general education upgrading and skill training. Research has shown that a person's chance of getting off welfare and staying off is directly related to their education levels. The Ontario Works program, however, does not allow general upgrading and training, focusing instead on job search skills and resume writing. This approach will not lead to long-term self-sufficiency of former welfare recipients since they will be denied the skills that lead to genuinely better paying and more stable work.

Mandates, Programs, Strategies

Advanced Education and Career Development (1998, March). "1998-2001 Business Plan." Alberta (Strategy)
http://www.aecd.gov.ab.ca/department/publications/business_plan/business_plan.htm, 1999, February 18.

This strategy report outlines the Alberta government's goals and actions in the area of adult learning. The 1998-2001 business plan promotes a strategic direction to attain the goals of accessibility, responsiveness, affordability, research excellence and effectiveness. Public consultations on key issues such as research excellence, performance-based funding, key performance indicators for publicly funded post-secondary institutions, learning enhancement, adult development reform, and a new vision for apprenticeship and industry training will be undertaken. Please see the report for greater detail.

Advanced Education and Career Development (1999, February 9). "Province Expands High-Tech Diploma and Degree Programs." Alberta (Program)
http://www.gov.ab.ca/acn/199902/7267.html, 1999, March 30.

More than 1000 additional students will be able to prepare for careers in Alberta's growing high-tech sector this fall, announced Clint Dunford, Minister of Advanced Education and Career Development. A $51 million allocation from the department's Access Fund will support creation of more student places in 21 post-secondary information and communication technology (ICT) programs across the province, effective this September. New funding will also support six expanded programs in teaching, rural nursing, social work, and academic upgrading in smaller communities. The Access Fund is an ongoing program to annually increase student places in Alberta's post-secondary system. The announcement follows Premier Ralph Klein's commitment to double the number of entry spaces in ICT programs over the next two years. "As I said in my televised address, our goal is 35,000 new jobs in this sector by 2005".
Please See Longer Abstract.

Advanced Education and Career Development (n.d.). "Enhancing Alberta's Adult Learning System Through Technology: Policy, Guidelines and Procedures for the Learning Enhancement Envelope." Alberta (Strategy)
http://www.aecd.gov.ab.ca/department/publications/system_funding/enhancing_thru_tech/background.htm, 1999, February 18.

Working together, Alberta's post-secondary institutions and Advanced Education and Career Development can enhance the province's adult learning system by using communications and information technologies. A total of $30 million over three years will be directed at the integration of technology into the system to support, expand, and improve the ways learners, teachers and curriculum interact. Enhancing Alberta's learning system through technology will

benefit both students and the institutions that serve them. Advanced Education and Career Development should provide leadership by supporting efforts to integrate technology with the adult learning system and by encouraging partnerships for the development of alternative models of learning and the design of new learning and support networks. The department should test the extent to which technology can improve learning and reduce costs by funding and closely monitoring plans and initiatives designed to meet those objectives. Technology integration needs to be considered in a context that deals with how technology affects learners, faculty, curriculum, support services and the roles of institutions.

Advanced Education and Career Development (n.d.). "Mandate: Advanced Education and Career Development." Alberta (Mandate) http://www.aecd.gov.ab.ca/department/, 1999, February 18.

Advanced Education and Career Development is dedicated to building a strong Alberta by helping people become self-reliant, capable and caring through lifelong learning. The department promotes prosperity for Alberta and its people by ensuring that adults have access to high quality, affordable adult learning opportunities that are responsive to changing demands. This will allow Albertans to develop and apply their knowledge, skills and talents to their full potential, resulting in competent, confident, self-renewing people who contribute to and share in Alberta.

Advanced Education and Career Development (1997, Nov. 24). "The Third Minister's Forum on Adult Learning." Dunford, C. H. Alberta (Strategy) http://www.aecd.gov.ab.ca/department/publications/whatweheard/1997forum.html#doct, 1999, February 18.

The Alberta government has been holding a series of Minister's forums on the state of adult learning in Alberta. In these opening remarks the Minister responsible outlines the following governmental goals in this area: Performance-based funding, Excellence in university research, New vision for apprenticeship training, and Youth Connections, which comes out of People and Prosperity. This web link is a great jumping off point for services and information in Alberta regarding life long learning.

Advanced Education and Career Development (n.d.). "People and Prosperity: A Human Resource Strategy for Alberta." Alberta (Strategy) http://www.aecd.gov.ab.ca/department/publications/people_prosperity/#intro, 1999, February 18.

People's lives encompass many important elements - learning, work, culture, spirituality, recreation, and commitments to families and communities. This paper focuses on two of these: the work and learning aspects of Albertans' lives. People and Prosperity deals with helping Albertans to reach their potential in the economy through human resource development. It identifies a vision for human resource development in the province, and outlines goals and actions that will help Albertans to take advantage of economic opportunities, and contribute to and share in Alberta's prosperity.

Alberta Science and Research Authority (ASRA) (1998, September 30). "Growing Alberta's Knowledge-Based Economy." Alberta (Strategy) http://www.gov.ab.ca/sra/, 1999, February 21.

This press release outlines the actions taken by the Alberta government, through the Ministry for Science, Research and Information Technology, in the area of information technology. According to the release, during this past year a number of significant science and research achievements occurred through the Ministry. Highlights include: a significant increase in provincial government investment in science and research; the Alberta Science and Research Fund was created with $5 million to invest in new initiatives; the Intellectual Infrastructure Partnership Program (IIPP) in Advanced Education and Career Development injected $15 million per year into the provincial research infrastructure; the development and promotion of the research strategy; and develop a plan with the Alberta Science and Research Authority (ASRA) to grow Alberta's knowledge-based economy.

Alberta Science and Research Authority (ASRA) (n.d.). "Mandate Alberta Science and Research Authority (ASRA)." Alberta (Mandate) http://www.gov.ab.ca/sra/, 1999, February 21.

The Science and Research Authority has a mandate to: stimulate research and development and related scientific activities in Alberta; develop a science and research policy and priorities that are compatible with the economic and social policies and priorities of the Government; conduct an annual review and evaluation of all Government science and research policies, priorities and programs, and their compatibility with the economic and social policies and priorities of the Government; develop and monitor a financial management plan for the science and research investments of the Government that maximizes returns to economic and social development; minimize duplication and promote co-operation; and encourage the science and research community and infrastructure in Alberta to attain international excellence to enable Alberta to be internationally competitive.

Alberta Society of Engineering Technologists (1998, September/October). "National Job Referral System Coming Soon." Alberta (Program) http://aset.worldgate.com/, 1999, February 21.

A new national job referral system listing jobs available and technicians looking for work was implemented this fall. The Internet-based system, known as the Canadian Technology Employment Net-work (CTEN), allow members of provincial associations of the Canadian

Council of Technicians and Technologists (such as ASET) to post their availability. Members are able to select from a variety of skill and experience checklists to provide a detailed outline of their backgrounds, plus supply a short written resume summary. Employers and agencies are also able to post their job openings.

Alberta Society of Engineering Technologists (1998, September/October). "P.ENG. Status Possible Through Challenge Exams." Alberta (Program) http://aset.worldgate.com/, 1999, February 21.

A new PLAR model is now facilitating engineering accreditation in Alberta. ASET members who do not want to pursue the long route of a full engineering degree through university study, but who still want to achieve Professional Engineer (P.Eng.) status, will soon have a new route available to them. ASET's Technical Education (TEC-ED) Committee has made arrangements with the University of Toronto to develop a series of 20 challenge examinations which, when successfully completed, will be considered sufficient academic preparation for P.Eng status by the Professional Engineers in Ontario. The Association of Professional Engineers, Geologists and Geophysicists in Alberta (APEGGA) will also be reviewing the challenge examinations and issuing appropriate credit. For those wanting to achieve an engineering degree, ASET's TEC-ED program offers specific university courses at night or on weekends in both Calgary and Edmonton.

Alberta Society of Engineering Technologists (n.d.). "Mandate: Alberta Society of Engineering Technologists." Alberta (Mandate) http://aset.worldgate.com/, 1999, February 21.

ASET was formed in 1963 as a professional organization for applied science and engineering technicians and technologists in Alberta. ASET's primary functions are to issue professional credentials to qualified individuals, to accredit training programs at Alberta colleges and technical institutes and to offer members a variety of services and benefits. ASET promotes careers in technology and makes print and audiovisual material available to junior high and high schools in Alberta. ASET acts as an advocate for the profession with business, industry, government, academic institutions, other professions and the general public. ASET membership consists of approximately 13,500 individuals, including full-time technology students, recent graduates and fully certified members. There are several categories of membership available.

Alberta Women's Science Network (1999, January). "Aboriginal Science in a Crate." Alberta (Program) http://www.cadvision.com/cgi-bin/byteserver/awsn/pdfs/news/JAN99.pdf, 1999, February 21.

The Aboriginal Science in a Crate Program has been developed as a resource for empowering Aboriginal youth by teaching science from a culturally relevant perspective. The program contributes to cross-cultural awareness and the understanding of Aboriginal science and technology through the development of curriculum materials that integrate Aboriginal ways of knowing. The first crate in the series "Thirteen Moons on Turtle's Back" is now available for

booking. For more information please contact Michelle Provost at Science Alberta Foundation. Phone: (403) 240-6285 e-mail: mprovost@saf.ab.ca.

Applied Science Technologists and Technicians of British Columbia (ASTTBC) (1998, December). "Certificate Offered in GIS Interactive Distance Learning." BC (Program) http://www.asttbc.org/, 1999, February 21.

Simon Fraser University has introduced 'UniGIS', North America's first interactive distance learning certificate in geographic information systems. The two-year program is designed for professionals working in GIS who want to increase their career prospects in the field. UniGIS focuses on design and implementation in real-life situations. Participants can take the program at home on their own schedule with no loss of salary. Contact Professional Programs, Continuing Studies, SFU, phone: (604) 291-5095.

Applied Science Technologists and Technicians of British Columbia (ASTTBC) (1998, December). "Additional Finding for Techworks!" BC (Program) http://www.asttbc.org/, 1999, February 21.

ASTTBC has received additional funding from HRDC for Phase II of its TechWORKS! program to develop technology-related work experience for high school students. The program reveals unimagined career possibilities that can alter a young person's life. It reinforces why core subjects like Math, English, Physics and Chemistry - and 'soft skills' like interpersonal communications and teamwork - are so important in today's technology-driven world. Employers realize productive work and a positive impact on other employees by taking students for work experience.

Applied Science Technologists and Technicians of British Columbia (ASTTBC) (1998, December). "Guest Editorial: Andrew Petter, Minister, Advanced Education, Training and Technology." Petter, A. BC (Strategy) http://www.asttbc.org/, 1999, February 21.

"Technology and its place in the BC economy has undergone an astonishing transformation over the last decade. Information technology is now the fastest growing industry in BC, employing 42,000 British Columbians in more than 5,700 high tech businesses. It is a $4.4 billion industry in BC and in the past six years alone, it has grown by 51 per cent. These changes have created new educational and employment opportunities for British Columbians. The BC government has recognized this and we are working hard to give British Columbians the education and skills that the high tech industry needs for growth. Over the past five years we've increased spending for post secondary education by $202 million and created over 500 new spaces in information technology programs. As well, my ministry's Industry Training and Apprenticeship Commission is strengthening the apprenticeship system and developing new designated trades and occupations in emerging and growth industries.".

Association of Universities and Colleges of Canada; Programs and Exchanges (1998). "Going Global - Science and Technology with European Partners (STEP)." (Program) http://www.aucc.ca/english/exchanges/ex5.html, March 12, 1999.

This program enables Canadian university researchers and professors to explore, establish or consolidate projects with partners in Europe. The projects are on technological research and development. Going Global is funded by the Department of Foreign Affairs and International Trade. Fields of study: pure or applied sciences, as well as engineering and related disciplines.

Atlantic Institute for Market Studies (n.d.). "Atlantic Institute for Market Studies website." New Brunswick, Newfoundland, Nova Scotia, PEI (Strategy) http://www.aims.ca, March 12, 1999. AIMS is an independent economic and social policy think tank. Their role includes:
- sponsoring research of the highest standards of objectivity and comprehensiveness, with a view to determining whether and to what extent market-based solutions can be successfully applied to the myriad social and economic problems facing Atlantic Canada;
- communicating the results of that research to the broadest possible audience of policy makers, opinion leaders, business people, professionals, academics, interest groups, students and the general public both regionally and nationally.

Aurora College (n.d.). "Pre-Technology Program." NWT (Program) http://www.auroranet.nt.ca/aurora/Calander99/e.%20Partnerships.htm, March 12, 1999. (from the description)

The Pre-Technology Program is designed to provide Northerners with the opportunity to upgrade their skills in communications, mathematics, science and computer applications. The successful graduate will have the credentials to apply for admission to an accredited Technology program at a post-secondary institution in Southern Canada. This program is designed to include a balance of theory and practical instruction, with the emphasis on personal management, learning and employability skills.

Aurora also offers other technology-related courses from time to time through third-party sources.

Aurora Research Institute (n.d.). "Aurora Research Institute." NWT (Program) http://www.aurresint.nt.ca/outre.htm, March 12, 1999.

Part of the Aurora Research Institute´s mandate is to promote:

- communication between scientists and the people of the communities in which they work;
- public awareness of science, technology and indigenous knowledge, and;
- the availability of scientific information to the people of the Northwest Territories.

- ARI helps researchers to share their findings by:
- creating and distributing plain language publications for researchers (see our Publication List for more information);
- organizing public presentations by researchers;
- recruiting presenters from the scientific community for the Innovators and the Science in Schools programs;
- informing researchers which community organizations and agencies should be contacted for consultation as part of the research licensing process.

Aurora Research Institute (n.d.). "Innovators in the Schools." NWT (Program) http://www.aurresint.nt.ca/innov.htm, March 12, 1999.

A good program to support science awareness in the community by linking scientists and researchers with schools. This program also provides support and assistance for school science fairs and can provide "Innovator Experts" as science fair judges.

BC Federation of Labour (BCFL) (1998, Nov. 23, adopted). "Education Committee Report; Industry Training and Apprenticeship Commission (ITAC)." **BC** (Program) http://www.bcfed.com/Conv/edrep98.htm#INDUSTRY, 1999, February 18.

On November 28, 1997, the Industry Training and Apprenticeship Act (ITAC) replaced the former BC provincial Apprenticeship Act. The ITAC is a government-sponsored initiative, created to build on the strengths of the apprenticeship system and expand BC's industry. It is a partnership made up of representatives of business, labour, education, training providers and government.

The mandate of ITAC is the creation of a training and apprenticeship system that: is relevant, accessible and responsive to industry's needs, meets the needs of the BC labour market, expands the number of skilled people in designated trades and occupations, increases the proportion of under-represented groups in trades and occupations, integrates education and training systems, promotes continuous life-long learning and develops and expands a system of provincially-recognized credentials.

BC Federation of Labour (BCFL) (1998, Nov. 23, adopted). "Project On Prior Learning Assessment And Recognition (PLAR)." BC (Program) http://www.bcfed.com/Conv/edrep98.htm#PROJECT, 1999, February 18.

The Project on Prior Learning Assessment is a systemic process of identifying, documenting, assessing and recognizing what a person knows and can do. Headed by the Canadian Labour

Force Development Board (CFLDB), the BC Federation of Labour is participating in the working group on PLAR. The goal of the Project is to identify practical solutions on how best the education, knowledge and skills acquired abroad by immigrants and others could be recognized in a bias-free, timely, systematic manner, and to facilitate the integration of immigrants in the labour market through the use of PLAR.

BC Federation of Labour (BCFL) (1998, Nov. 23, adopted). "Skills Canada." BC (Program) http://www.bcfed.com/Conv/edrep98.htm#SKILLS, 1999, February 18.

Skills Canada is a unique non-profit organization made up of labour, business, educators and provincial and federal government representatives devoted to increasing youth trade and technical skill competitions for secondary and post secondary students at regional, provincial, national and international levels.

The Skills Canada Competition was held May 14 and 15, 1998 at BC Place in Vancouver. Over 2,000 of Canada's finest skilled youth, along with 10,000 people, were in attendance. BC high school, post secondary students and apprentices took first in automotive service technician, computer-aided design (CAD) and graphic arts, among others.

Biotech Working Groups (Nova Scotia) (n.d.). "BioNova." Nova Scotia (Program) http://www.biotech.ca/members/bwgns.html, March 12, 1999.

This group devotes space and time to policy and regulatory concerns, including workshops on specific issues. For example, the following workshop was held on March 15-16, 1999 in Toronto:
Details: Regulatory Reform '99: A Strategic Update
Topic: A timely, unique program on critical developments in the ever changing regulatory environment of Canada's agri-food system
Note: There is another session, 5-6 May 1999 in Vancouver, BC
Phone: 1-613-722-1000
Fax: 1-613-722-1404
Email: fic@foodnet.fic.ca
Mission Statement: BioNova's mandate is to act as an information-sharing, networking and advocacy organization for senior managers of companies and individuals in Nova Scotia interested in the commercialization and utilization of advanced biological technology. BioNova focuses on the active pursuit of commercialization and utilization of advanced biological technology. BioNova assists member firms to prosper through initiatives designed to secure business and development opportunities in national and international markets.

Biotechnology Human Resource Council (1998, November). "Skills Development Programs." (Program) http://www.bhrc.ca/training/sdp.htm, March 26, 1999.

BHRC delivers a variety of workshops to increase public awareness of science and technology, as well as employment related to S&T. The workshop "An Introduction to the Science of Biotechnology" was delivered last fall and targeted specifically to individuals with a non-scientific background. Bioinformatics workshops are scheduled for later this year in Calgary and Vancouver. With these educational programs, the BHRC is addressing IT support needs in the biotechnology sector.

Canadian Advanced Technology Alliance (1999, January 19). "Partnership Will Boost Advanced Technology Management Skills in the Canadian MBA Curriculum." (Program) http://www.cata.ca, March 12, 1999. (from the release)

The National Advanced Technology Management Competition (NATMC) has joined forces with the Canadian Advanced Technology Alliance (CATA) and the University of Ottawa to launch the NATMC B CATA Alliance Scholarship Award Program.

The national Program will provide scholarships to students studying Advanced Technology Management in MBA schools across Canada. The support will help expand the annual NATMC forum, now in its tenth year, and the only national competition of its kind. This year the competition finalists will compete in Ottawa on March 11th, 1999.

The NATMC B CATA Alliance Scholarship Program is designed to allow CATA member companies the opportunity to reinforce their position as key players within the advanced technology sector. By supporting this program through Sponsorships, companies put their name on a Scholarship Award which recognizes their contribution to the competition, and awards a $2000 scholarship to an MBA school team who will compete in the year 2000 National Advanced Technology Competition.

Canadian Advanced Technology Association (1998, Nov. 26). "CATA Alliance Will Hold Revenue Canada Accountable to A Time Line in Creating an Effective R&D Tax Incentive: Five Part Plan Launched." (Program) http://www.cata.ca/cata/news/five-part.html, 1999, February 21.

CATA Alliance promotes a new of a twelve-month program designed to improve Canada's SR&ED Tax Credit System. Highlights: 1). An On-Line SR&ED monitor, (2) Best Practices: research and analysis work will be converted into a set of best 'SR&ED' practices for companies to follow in the utilization of the SR&ED program, (3) R&D Help Line: an on-line help service and special newsletter, (4) Seminars: a series of industry seminars will be offered across Canada, (5) Ongoing Advocacy: CATA's Network of 2700 enterprises will be fully deployed to support the revitalization of the program and to spearhead advocacy activities.

Since 1978, CATA has been advocating discussion about R&D tax incentives as a major factor in helping create Canada's new economy. Today the SR&ED program is viewed more as an audit

initiative rather than being managed as an incentive program. It's time we fixed the problem, re-established the partnership and got on with the work of realizing the knowledge-based Canada.

Canadian Advanced Technology Association (1998, June 2). "Deloitte & Touche and CATA Alliance Join Forces to Create "Best Practices" Benchmarking for Canadian Technology Companies." (Program) http://www.cata.ca/cata/news/benchmarking.html, 1999, February 21.

Deloitte & Touche and the CATA Alliance will be working together to create and maintain an information database logging benchmarking and best practices for and about Canadian information technology companies. These are business tools that represent systematic attempts by organizations to study and learn about business practices that may be put to use within their organizations to promote competitive excellence. Data will help most organizations find out how their business compares with their competitors. Also to be looked at is best practices for useful business ideas that have been successfully applied in other sectors. Initially, the types of benchmarking and best practices that will be found on the database include: Financial: liquidity, productivity/efficiency, return/valuation, other Operations: software development, new product development, channel & product management, delivery channel management (e-commerce), and sales & marketing.

Canadian Advanced Technology Association (1998, March 24). "Sprint Canada & CATA Team Up to Promote Canada's Technology Cities to the World." (Program) http://www.cata.ca/cata/news/fastforward.htm, 1999, February 21.

Sprint Canada Inc. and the Canadian Advanced Technology Association (CATA) today announced that they will join forces to launch an innovative, Internet-based program. Entitled Fast Forward (Canada), the program will make use of the latest Internet tools to create a number of Canadian virtual business corridors to promote the "best in class" technology of some of Canada's leading cities to investors, partners and high-tech workers.

Canadian Advanced Technology Association (1998, Jan. 7). "CATA and Job Clips Team Up to Help High Tech find Skilled Personnel." (Program) http://www.cata.ca/cata/news/clips.htm, 1999, February 21.

CATA is pleased to announce a partnership in Internet employment services with Ottawa based, Job Clips. CATA President John Reid said, "Job Clips 'reverse recruiting' program is a great fit for CATA's newest business service, TechnoSkill, a world wide web service created to help fill the current high-tech skills shortage, and thus, advance the Canadian industry's competitive performance". Reverse recruiting motivates a direct response from professionals in engineering and IT by promoting companies directly, one to one, to these high tech professionals. The referral source is Job Clip's proprietary databases and special news group postings. Companies then receive direct email responses from knowledgeable and interested candidates, who were often passive in any career search activities.

Canadian Advanced Technology Association (1998, Sept. 10). "Certified Advanced Technology Manager Program Available in Western Canada." (Program) http://www.cata.ca/cata/news/catm.html, 1999, February 21.

The Certified Advanced Technology Manager program (CATM) is now available in Western Canada thanks to a partnership between the University of Calgary's Faculty of Continuing Education, Learnsoft Corporation, and CATA. CATM is a comprehensive management and business skill development course designed for technology managers. "The current program being offered by U of C is a unique partnership between private industry and the university, which allows us to provide potential and current managers with solid skills which are unique to their industry," says Michael Gaffney of Learnsoft who developed the program. CATM teaches managers how to analyse and prepare a business case for a new product or service, develop unique strategies for analysing financial risk and technology development risk and provides details on how to manufacture, market and service new technology products. The program has been offered since 1993, and has about 500 graduates.

Canadian Advanced Technology Association (1999, January 19). "Partnership Will Boost Advanced Technology Management Skills in the Canadian MBA Curriculum." (Program) http://www.cata.ca/cata/news/awardprgm.html, 1999, February 21.

The National Advanced Technology Management Competition (NATMC) has joined forces with the Canadian Advanced Technology *Alliance* (CATA) and the University of Ottawa to launch the NATMC B CATA *Alliance* Scholarship Award Program. The national Program will provide scholarships to students studying Advanced Technology Management in MBA schools across Canada. The NATMC is a unique venue to help train the kinds of managers Canada will need tomorrow in the knowledge-based economy. Classroom theories are put to use in solving Harvard-style cases written about existing firms." The NATMC B CATA *Alliance* Scholarship Program is designed to allow CATA member companies the opportunity to reinforce their position as key players within the advanced technology sector.

Canadian Advanced Technology Association (1998, April 20). "Brain Gain Through Telework: CTA & CATA Team Up to Connect International Teleworkers with Canada's Technology Companies." (Program) http://www.cata.ca/cata/news/telework.htm, 1999, February 21.

The Canadian Telework Association (CTA) and the Canadian Advanced Technology Association (CATA) have teamed up to create the first job board dedicated to telework in Canada. The Canadian Telework Job Board (http://www.technoskill.com/teleworkjobs/) is an automated on-line job matching service, jointly established by these two non-profit organizations. Its objective is to facilitate the matching of high tech and related workers all over the world with Canadian employers who wish to engage them.

Canadian Autoworkers Union (n.d.). "The Windsor co-op apprenticeship Pilot Project." Ontario (Program) http://www.caw.ca/bill55/acttorevise.html, 1999, February 21. The Windsor co-op apprenticeship Pilot Project is supported by the CAW, Chrysler Corporation, and St.Clair College.

The program provides students with a chance to learn at school and to learn from skilled trade journey persons in the plant. There are currently 25 co-op students in the program. Because of the co-op nature of the initiative, these students will have accumulated a substantial amount of hours toward their apprenticeship, while at the same time achieving credits towards the Electrician/Electronics Engineering Technology Co-Op Program. The first year of schooling is directly related to the in-school portion of an industrial electrician apprenticeship.

Canadian Council of Professional Engineers (n.d.). "Mandate: Canadian Council of Professional Engineers." (Mandate) http://www.ccpe.ca/, 1999, February 18.

The Canadian Council of Professional Engineers (CCPE) was established in 1936 as the Dominion Council of the Associations and Corporation of Professional Engineers of Canada to act as a national coordinating body for the provincial engineering licensing authorities. Today, CCPE is the federation of ten provincial and two territorial regulatory associations that collectively license and represent more than 160,000 professional engineers nationwide. CCPE's prime objective is to assist its constituent associations in coordinating their activities in such areas as licensing, professional practice, education and the establishment of minimum qualifications for practicing engineers. It also strives to improve the general public's understanding of engineering as a vital profession in Canada, and represents the best interests of the engineering community at the federal government level. This national organization also conducts educational courses which serves the needs of its professional members, as well as providing scholarships to university students in this area.

Canadian Council of Technicians and Technologists (CCTT) (n.d.). "Reciprocity Agreement Aids Cross Border Mobility." (Program) http://www.cctt.ca/Secondarypages/tcwin98.htm, 1999, February 21.

CCTT has a reciprocity agreement with the National Institute for Certification in Engineering Technologies (NICET) in the States which allows certified technologists moving between the two countries to have their professional credentials recognized. In 1989 CCTT first began discussing the possibility of a reciprocity agreement with NICET. Spurred by the need for mobility of technicians and technologists between Canada and the States, especially once the North-American Free Trade Agreement was in place, CCTT and NICET stepped up their negotiations in 1991. The first memorandum of intent between the two organizations was signed that year.

Canadian Council of Technicians and Technologists (CCTT) (n.d.). "Canadian Technology Career Advancement Project." (Program) http://www.cctt.ca/Secondarypages/tcwin98.htm, 1999, February 21.

The Canadian Technology Human Resources Board (CTHRB) has undertaken a three-part project which will deliver a set of tools to help technicians and technologists across the country manage and further their careers. The CTHRB is a partnership of industry, technology practitioners and educators that promotes the use of national technology standards across the country and helps technology employers identify and resolve human resource issues. The Canadian Technology Career Advancement (CTCA) project is a three-part resource intended to benefit everyone involved in the technology sector - individual practitioners, employers and new technology graduates. The Technology Career Credit Bank will store technicians' and technologists' training and education and match these against the national standards to determine their level of qualification.

Canadian Council of Technicians and Technologists (CCTT) (n.d.). "Working in the US Under NAFTA: Guidelines For Technicians and Technologists." (Strategy) http://www.cctt.ca/Secondarypages/TCwin97.htm, 1999, February 21.

This article provides a full explanation of the process which facilitates the ability to work in the US high technology sector. The article outlines all the criteria, eligibility, documentation, and specific advice needed to become one of the statistics on "brain drain". Currently there are four categories of business persons eligible to work in the US on a temporary basis under NAFTA: business visitors; traders and Investors; intracompany transferees; working professionals. While this organization is representing its Canadian membership, this article certainly encourages and facilitates the move to the US as it provides all the supporting documentation needed to work as a professional under NAFTA.

Canadian Council of Technicians and Technologists (CCTT) (n.d.). "Putting Technology to Work." (Program) http://www.cctt.ca/Secondarypages/TCsum97.htm, 1999, February 21.

A national placement service has been established to provide first work opportunities for graduate technicians and technologists. The Technology First Work Placement Service (TFWPS) is a not-for-profit service whose main goal is to help graduate technology students get the work experience they need to start their careers. TFWPS pairs graduate technicians and technologists with small to medium sized Canadian businesses for paid work terms of between eight and 12 weeks. During the terms, the graduates will be hosted by a certified technician or technologist (CTech, CET, RET or AScT) who will serve as a mentor and explain the requirements of the technology practitioner in the work place. Employers will also benefit by having access to a pool of highly qualified graduates from whom they can choose to hire employees for a short term, with the possibility of a more permanent relationship.

Canadian Council of Technicians and Technologists (CCTT) (1998, Summer). "Technofile." (Program) http://www.cctt.ca/Secondarypages/TCsum98.htm, 1999, February 21.

TechnoFile is an innovative on-line resource to help both technology employers and technology workers. TechnoFile streamlines and reduces hiring costs for companies, as well as giving them instant access to a pool of highly qualified technology practitioners. Technology practitioners will benefit by using TechnoFile to help manage their careers, which will lead to increased professional development and mobility. Their credentials will be validated using the CTHRB's Canadian Technology Standards.

Canadian Council of Technicians and Technologists (CCTT) (1998, Summer). "Canadian Technology Human Resources Board (CTHRB) Projects: Profile." (Program) http://www.cctt.ca/Secondarypages/TCsum98.htm, 1999, February 21.

Technology PROfile is a work diary or log for technology workers to record their experiences, training, competencies, skill sets and professional development. Based on the CTHRB's Canadian Technology Standards which detail the competencies for 47 technologist and 66 technician occupations, PROfile will enable technology workers to track their accomplishments. PROfile is designed to help technology practitioners identify the competencies required in their occupational profiles, as well as identify the competencies they wish to obtain for professional development.

Canadian Film Centre, Medialinx h@bitat (n.d.). "New Media Design Programme." Ontario (Program) http://www.cdnfilmcentre.com/frames.html, February 25, 1999.

"MediaLinx h@bitat's New Media Design Programme is a four-month intensive, project and team-based training course designed to foster the creation of compelling new media products. The programme is not primarily about software, but rather about developing a strong, sound marriage between creative and business management skills. ... Drawing on the expertise of leading new media professionals, the programme provides a thorough grounding in four critical skill areas: the art and craft of digital storytelling, business and financial management, team building and technology."

Canadian Foundation for Innovation (n.d.). "Canadian Foundation for Innovation." (Program) http://www.innovation.ca/english/index/index.html, March 12, 1999. (from the website)

The Canada Foundation for Innovation (CFI) is an independent corporation established by the federal government to strengthen Canadian capability for research. The CFI will achieve this objective by committing funds over the next five years in the development of research infrastructure in Canada.

The CFI's mandate is to increase the capability of Canadian universities, colleges, hospitals, and other not-for-profit institutions to carry out important world-class scientific research and technology development. To implement its mandate, the Foundation, in co-operation with funding partners, provides infrastructure for research and development that will:

- support economic growth and job creation;
- lead to improvements in health, the environment, and quality of life;
- build capacity for innovation;
- strengthen training for research careers for young Canadians;
- attract and retain capable researchers in Canada;
- promote networks and collaboration among researchers; and
- ensure the optimal use of Canadian research infrastructure by promoting sharing within and among institutions.

Canadian Innovation Centre (1998). "Canadian Innovation Centre." (Program) http://www.innovationcentre.ca/

Our mission is "to advance innovation by leading our clients to better business decisions through information, development and commercialization services."

"Our services include: idea assessment, technology evaluation, market research, and seminars and training programs relating to commercializing innovation.".

Canadian Labour Congress (n.d.). "Mandate: Canadian Labour Congress." (Mandate) http://www.clc-ctc.ca/eng-index.html, 1999, February 18.

The Congress is the national voice of the labour movement, but we speak for all workers and their families, in Canada and beyond. The majority of national and international unions in Canada belong to the Congress, and the CLC includes 12 provincial and territorial federations, and 125 district labour councils. We represent 2.3 million unionized workers. We promote decent wages and working conditions, and improved health and safety laws. We lobby for fair taxes and strong social programs, including childcare, medicare and pensions. We lobby for and develop job training and job creation programs. We work for social equality, and to end racism and discrimination. We try to increase solidarity between workers in Canada and other countries.

Canadian Labour Force Development Board (1998). "Training Standards." (Strategy) http://www.clfdb.ca/english/library/pdf.htm, Mar. 18/99.

The Canadian Labour Force Development Board (CLFDB) is an independent organization established in 1991 and made up of partners from business, labour, education and training, and the equity groups to play a leadership role on training and labour development issues.

"National standards are an important step in creating an equitable, effective and efficient training system in Canada." This document outlines the minimum standards needs to ensure quality training in Canada. They are designed to be used by anyone making decisions about training, from individuals seeking a training course to a local board seeking to identify local training needs. "The standards require that those who buy training work with those who provide training in defining needs, recruiting participants and assessing effectiveness.".

Canadian Space Agency / NSERC (n.d.). "CSA/NSERC Research Partnership Program." (Program) http://www.space.gc.ca/ENG/Business/Partnership/nserc.html, March 12, 1999.

The program is implemented in collaboration with the Natural Sciences and Engineering Research Council (NSERC) who, along with the CSA, match private sector funding (dollar for dollar) in support of jointly approved university projects consistent with the priority research needs as established by the CSA. These priorities include Earth observation, satellite communication, robotic systems, and science missions.

Eligibility and Available Funding:
The program is open to Canadian Science and Engineering faculties carrying out space technology related research, with targeting university research support, largely for postgraduate student and postdoctoral fellow stipends. The funds from all sources can amount to a maximum of $150,000 per annum (1/3 CSA, 1/3 NSERC and 1/3 Industry) for a total of $450,000 for three-year project.

Canadian Steel Trade and Employment Congress (n.d.). "Skill Training Program." (Program) http://www.cstec.ca/skill.html, 1999, February 18.

The goal of CSTEC's Skill Training Program is to improve the level, quality and transferability of skills in the steel industry. In initiating this program, CSTEC's Board of Directors believes this goal is critical to improving the future productivity, competitiveness and employment security of the steel industry and its employees. To achieve this goal, CSTEC offers local Joint Training Committees (JTCs) a range of important services and programs including the following: Joint Training Committee (JTC) Orientation; Training Plan and Budget Development and Tracking; Training Needs Analysis and Assessment; Training Course Development; The Steel Industry Training Program (SITP); Training Accreditation and Certification; SITP Course Achievement Awards; SITP Certificates/Diploma; Prior Learning Assessment and Recognition (PLAR); Training Funding; Training Evaluation.

The CSTEC has recently signed a national agreement with 19 colleges in 6 provinces. This agreement provides a system of national accreditation and recognition for courses in their programs. The credits received in this program can be used towards certificates/diplomas in this program or towards any other program in the participating colleges.

Canadian Steel Trade and Employment Congress (n.d.). "Mandate: Canadian Steel Trade and Employment Congress." (Mandate) http://www.cstec.ca/index.html, 1999, February 18.

The Canadian Steel Trade and Employment Congress (CSTEC) is a joint-venture between the United Steelworkers of America (USWA) and Canada's steel producing companies. The idea of a Congress was developed at an industry conference that was held in Sault Ste. Marie, Ontario in 1985. Its initial mandate was to promote joint research, lobbying and education efforts on steel trade issues. In 1987, the Congress changed its name to the Canadian Steel Trade and Employment Congress (CSTEC) to incorporate an expanded mandate of providing adjustment and training assistance to permanently laid-off workers in the steel industry. In 1992, CSTEC again extended its mandate to include training for the current workforce in the steel industry. It initiated a Skill Training Program that was cost-shared between the steel industry and federal and provincial governments. More recently, CSTEC has worked with the 19 colleges/cégeps in the steel making communications across Canada to develop a very innovative Steel Industry Training Program (SITP).

Canadian Steel Trade and Employment Congress (n.d.). "The Worker Adjustment Program." (Program) http://www.cstec.ca/worker.html, 1999, February 18.

The goal of CSTEC's Worker Adjustment Program is to improve the skills, adaptability, confidence and employability of laid-off workers in the steel industry. To this end, CSTEC provides laid-off workers a range of adjustment and job placement services through their local adjustment committees. CSTEC provides the following services: Local Adjustment Committee Training Services; Peer Counselling and Needs Assessment Services; Seminars in Goal Setting; Financial Planning; Job Shop; Small; Business and Prior Learning Assessment and Recognition (PLAR); Job Placement Services; Training Referral Services.

Canadian Technology Human Resources Board (n.d.). "The Technology First Work Placement Service (TFWPS)." (Program) http://www.cthrb.ca/1tech/english/, March 12, 1999. (from the website)

The Technology First Work Placement Service (TFWPS) was developed to address the issue of high unemployment among Canada's youth. A serious impediment to employability is a lack of experience, and one of the best ways to ensure that a young person can find meaningful employment after finishing a course of study is to provide that person with an opportunity for an appropriate first work experience.

The TFWPS is a national, not-for-profit placement service that has been established to provide unemployed graduate technologists and technicians with valuable first work experience. After gaining this work experience, the graduate technologists and technicians will be better able to find full-time work in their field of study. As participant in the TFWPS, graduate technologists and technicians will be placed in paid work terms of between 8 and 12 weeks with small to medium-sized firms. These work terms will take place in any part of Canada where there is industry demand for technologists and technicians. The graduate technologists and technicians will be hosted by Certified Engineering Technologists (CET's).

The TFWPS is open to recent graduates of Canadian technology programs that meet the standards established by the Canadian Technology Human Resources Board. If you have graduated since the spring of 1995, you can apply to the TFWPS. Any firm that employs technologists and technicians can register with the TFWPS. The TFWPS will help to provide companies with access to top quality technology graduates. Managers will be able to ensure that their workforce has the skills and knowledge needed to help their firms to enhance their profits and competitiveness.

Centre for Labour and Management Studies (n.d.). "Mandate: Centre for Labour and Management Studies." BC (Mandate) http://clams.ubc.ca/, 1999, February 21.

The Centre for Labour and Management Studies was established by the UBC Senate in the Faculty of Commerce and Business Administration in 1993. Its mandate is to undertake research on workplace issues and to assist organizations in the processes of innovation and adaptation. CLAMS seeks to support solutions to workplace problems that will help improve labour-management relations. Its location at the University of British Columbia provides a neutral forum for research and gatherings of labour, business, government and academic professionals.

Centre for Research in Earth and Space Technology (n.d.). "CRESTech." Ontario (Program) http://www.crestech.ca, February 18/99.

The Centre for Research in Earth and Space Technology (CRESTech) funds R-and-D activities in its areas of expertise. One of its goals is to support the development of highly qualified personnel which it does via a series of grad student research awards, a job fair and a business skills course.

Communications and Information Technology Ontario (n.d.). "Communications and Information Technology Ontario." Ontario (Program) http://www.cito.ca, February 18, 1999.

CITO (Communications and Information Technology Ontario) is an Ontario Centre of Excellence funded by the Ontario Ministry of Energy, Science and Technology. Its mission is to strengthen the global performance of Ontario's information technology and communications industries through university / industry research partnerships involving the interchange of people, ideas and technologies. Part of their strategy to develop highly qualified personnel includes

increasing funding for PhD and Masters students and expanding their student program mainly through industrial internships. CITO also offers a CV directory designed to assist the CITO student community in finding opportunities to pursue their careers in the telecommunications research field. As well as listing CVs by student name, the directory provides a variety of search mechanisms to identify qualified candidates. Copies of CVs may be downloaded.

Council of Ministers of Education, Canada (1995, July 6). "Progress Report on the National Education Agenda." (Program) http://www.cmec.ca/natupen.htm,

Removing Barriers to Postsecondary Education - related to skills; the fewer barriers there are, the more opportunity there is to gain skills.

Council of Ministers of Education, Canada (1997, July). "Developments in Information Technologies in Education." (Program) http://www.cmec.ca/reports/edtech-en.stm,

Integrating technologies into the curriculum in each of the provinces and territories is seen to be a necessary tool to help "students acquire the technological competencies they will need for further education, or for employment opportunities . . . Computer literacy is one of the skills Canadians will need to survive in the new knowledge-based economy.".

Council of Ministers of Education, Canada (1998). "Report on Education in Canada." Federal (Program) http://www.cmec.ca/reports/rec98/, (from the website)

"Provinces and territories are implementing education and training initiatives to help ease the transition from school to work, especially for young people. Many of these initiatives are based on successful international models that the jurisdictions have adapted to regional needs, or on existing programs that they have modified to be more effective in addressing the changes in their economies."

Council of Ministers of Education, Canada (1997, September). "Towards Well-Balanced Technology-Enhanced Learning Environments: Preparing the Ground for Choices Ahead." (Program) http://www.cmec.ca/reports/infoteche.stm

This site gives an overview of the needs and possibilities ICTs create as well as suggestions for a CMEC strategy on Information and communication technologies in education.

Overall, this document stresses that "technology is changing in leaps and bounds" and students, businesses, industry and government must keep up with the changing world. Education is one way this could occur. The use of information and communication technologies in a learning environment could support equity of access and could provide an environment that is more responsive to learning needs. This will develop and meet the increasing demands markets have for employing individuals with "higher-order thinking and technical skills.".

Economic Innovation and Technology Council (n.d.). "Economic Innovation and Technology Council." Manitoba (Program) http://www.eitc.mb.ca/,

"Its goals are to get stakeholders to work together; to facilitate the development and commercialization of technology; to position Manitoba as a world class environment for economic innovation; to create an entrepreneurial climate; and to encourage innovation in education and training."

Education, Culture and Employment (1994). "People: Our focus for the future." NWT (Strategy) http://siksik.learnnet.nt.ca/strategy2010/strat_94/index.htm, March 4, 1999.

The territories deal with obvious geographical and climactic barriers to regular business and education operations, at least compared to those experienced in southern Canada. This is in part manifest in a dependence on internet and telecommunications systems. As part of their education strategy, the NWT recognizes the need to "develop a training strategy to support the use of information networks", and "improve staff development" in this area. They have also identified a need to invest in information networks. The relevance to the mandate of the Expert Panel lies in this fact, that one of the greatest high-tech skill needs in the territories is in the IT sector.

Environment Canada (n.d.). "Canadian Environmental Technology Advancement Centres (CETACs)." (Program) http://www.ec.gc.ca/etad/cetacs_e.html, March 12, 1999. (from the website)

To help meet the needs of Canada's growing environmental industry, the federal government has supported the establishment of three Canadian Environmental Technology Advancement Centres (CETACs), in partnership with provincial governments, environmental industry associations and the private sector.

The CETACs are private sector, not-for-profit corporations, operating at arm's length from government. Each Centre's goal is to help small and medium sized enterprises (SMEs) commercialize environmental technologies by providing comprehensive technical services, access to investment capital, business counselling, and regulatory and market analysis.

CETACs are: Enviro-Access Inc., Sherbrooke, Quebec
Ontario Centre for Environmental Technology Advancement (OCETA) Inc. ,Toronto, Ontario
The Canadian Environmental Technology Advancement Corporation, Calgary, Alberta.

Environment Canada (n.d.). "Science Horizons: Environment Canada Youth Internship Program." (Program) http://www.ec.gc.ca/sci_hor/index.htm, February 10, 1999. (from the website)

The EC Science Horizons program is a collaborative effort with universities, provinces, industry and non-government organizations. The program will encourage promising young scientists and post-secondary graduates through mentoring and coaching by experienced scientists and program managers and will give them hands-on experience working on environmental projects. (funded by HRDC).

Gender and Sustainable Development (n.d.). "Mandate: Gender and Sustainable Development." BC (Mandate) http://www.sdri.ubc.ca/gender/index.html, 1999, February 21.

The website on Gender and Sustainable Development houses two dynamic documents which explore a broad range of issues concerning gender and sustainable development: a Policy Agenda, entitled "policy woven from a web of values", which contains over 100 policy recommendations developed for the UN Fourth World Conference on Women, held in Beijing in 1995; and an Annotated Bibliography, which illustrates the breadth and depth of the work being produced in the domain of gender and sustainable development. This project was developed as one of the follow-up actions from the 1994 "Women and Sustainable Development: Canadian Perspectives Conference" held in Vancouver, British Columbia.

Georgian College (1999, February 19). "Three colleges form aviation training partnerships." Ontario (Program) http://www.georcoll.on.ca/news/news/avlinks.htm, February 25, 1999.

Georgian, Canadore, and Seneca Colleges have formed a partnership that will enable them to work co-operatively to develop and deliver programs in a wide variety of aviation fields. The three colleges signed a memorandum of understanding on Feb. 14, 1999. In addition to combining the college's expertise in a broad range of aviation technical, management and service training, the agreement provides for the development and delivery of contracted training for specific clients provincially, nationally and internationally in the aviation field.

Georgian College, Canadian Automotive Institute (n.d.). "Canadian Automotive Institute." Ontario (Program) http://strategis.ic.gc.ca/SSG/am00752e.html, February 25, 1999.

The Canadian Automotive Institute has been established to offer educational service to the automotive industry. The Institute and its services are operated by Georgian College of Applied Arts &Technology with the advice of a National Advisory Board representing automotive industry associations, manufacturers, and dealer associations across Canada.

The programs available through the CAI meet the varied educational needs of the industry:

- Post-secondary diploma programs in automotive marketing, advertising, computer programming, industrial design, and engineering;

- Co-operative work experiences;
- Part-time certificate studies in sales management and inventory/parts management;
- Seminars, workshops, conferences, and information exchange programs;
- Applied research and development services; and
- Database and information services."

Georgian College, Canadian Aviation Institute (n.d.). "Canadian Aviation Institute." Ontario (Program) http://www.georcoll.on.ca/cavi/, February 25, 1999.

"The Canadian Aviation Institute is the national focal point for aviation training across Canada and internationally. The Institute provides one-stop training service for individuals interested in a career in the aviation industry. Located at Georgian College in Barrie, Ontario, Canada, the Canadian Aviation Institute offers a diversity of post-secondary education as well as specialized training opportunities directed at the domestic and international civil aviation community. The objective of the Institute is to provide unique managerial and operational civil aviation training."

Government of Canada (1997). "Common Framework of Science Learning Outcomes K to 12." (Program) http://www.cmec.ca/science/framework/

"Science education will be a key element in developing scientific literacy and in building a strong future for Canada's young people. The framework is guided by the vision that all Canadian students, regardless of gender or cultural background, will have an opportunity to develop scientific literacy."

There are 4 foundations listed, from which this will occur:

1. Science, technology, society, and the environment (STSE)
2. Skills
3. Knowledge
4. Attitudes.

Human Resources Development Canada (n.d.). "Using Science and Technology to Better Serve Canadians." (Strategy) http://hrdc-drhc.gc.ca/hrdc/initiatv/s-t/sc120_e.html#2, March 12, 1999.

The directions being pursued by HRDC can be described in the context of the seven principles set out in Science and Technology for the New Century:

1. Increasing the Effectiveness of Federally Supported Research
2. Capturing the Benefits of Partnership
3. Emphasizing Preventive Approaches and Sustainable Development
5. Extending Information Networks.
6. Strengthening International Science and Technology Linkages
7. Promoting a Stronger Science Culture

(each of these is elaborated on in some detail, including a list of all associated programs, initiatives, etc.).

Human Resources Development Canada and Ontario (1997, March). "Ontario Job Futures." Ontario (Program) http://www.ont.hrdc-drhc.gc.ca/english/lmi/eaid/occ.info/ojf/jobf_e.html, February 18, 1999.

The objective of ***Ontario Job Futures*** is to assist career and vocational counsellors in their work by providing background information on major trends in the economy and labour market and a set of 157 occupational profiles. The document provides an overview of industry and occupational trends in Ontario. The profiles are organized according to the occupational groupings as used in the National Occupational Classification System. Each profile covers five elements: description; main duties; education/training; outlook; characteristics of occupation.

Human Resources Development Canada, Royal Bank, IBM, KidsNRG (n.d.). "GirlsAreIT." (Program) http://www.girlsareit.com, March 12, 1999. (from the description)

Between January - June 1999, 1000 high school students from across Canada are creating real-life multimedia products in an exciting new program: KidsAreIT! / GirlsAreIT!. GirlsAreIT! is an amazing program that offers young women a unique opportunity to express their ideas, passion and dreams. GirlsAreIT! is a 32-hour team-based experience that is built on an innovative methodology developed by KidsNRG.

GirlsAreIT! is:

- a team-based program designed to showcase key issues of concern to youth
- a program that brings together mentorship, guidance and support to help youth achieve success

- a joint initiative of business (KidsNRG, IBM, and Royal Bank) government (HRDC), community, school boards, high school and university/college students designed to strengthen and build entrepreneur-ability and technology skills in youth through a 32-hour program

- an extra-curricular program being delivered at schools, inside corporations, for employees' kids, and in community centres to over 1000 students aged 14-18 across Canada in rural, urban and aboriginal communities.

Information Highway Secretariat (n.d.). "IT Workready Workforce Initiative." New Brunswick (Program) http://www.gov.nb.ca/edt/ITfunds/index.htm, March 12, 1999.

Provides funding for the IT industry to recruit and train individuals in IT. Gives preference to New Brunswick residents, but will assist companies to recruit from outside province. Three programs are available under this initiative:

- IT Workforce Development Fund

- IT Training Program Fund

- Curriculum Development Fund.

Information Highway Secretariat (n.d.). "Information Highway Secretariat website." New Brunswick (Program) http://www.gov.nb.ca/edt/infohigh/index.htm, March 12, 1999.

Contains links to industry directory, ITJOBNET (a job database listing for the IT sector), the New Brunswick Innovation Network (funded by the Canada/New Brunswick Regional Economic Development Agreement--REDA--administered for the federal government by the Atlantic Canada Opportunities Agency and for the provincial government by the Regional Development Corporation).

Institute for Professional Development, University of Alberta (n.d.). "The New Telus Centre." Alberta (Strategy) http://www.ualberta.ca/TRG/tc/tchome.htm, 1999, February 21.

On 23 June, 1998, TELUS made a formal announcement of a $12.9 million donation to the University of Alberta for the establishment of a new executive and professional development facility, to be called the TELUS Centre. This world class facility will house and be managed by the university's Institute for Professional Development, and will showcase enhanced learning through the application of innovative technology. Reflecting the trend in education and business for "just-in-time" learning, the Centre will serve as a hub for a national and international network of partners and clients seeking excellence in research, development and delivery of customized continuing education programs, to be offered at the Centre and across the world.

ITANS (n.d.). "Information Technology Industry Alliance of Nova Scotia - Divisions." Nova Scotia (Program) http://www.itans.ns.ca/divisions.html, March 12, 1999.

The Education & Training division of ITANS is responsible for inter-association and educational matters. Current activities include: Member Survey, Measuring the IT Skills Gap, IT apprenticeships, Promote Nova Scotia Program. Director: Ian Blanchard (453-4300) - ian_blanchard@maritimelife.ca

The Programs division is responsible for business development, membership development, and networking programs. 1997/98 activities include: Monthly Business Exchange Program, Year 2000 Symposium, Career Fair, IT Awards Program, Annual General Meeting, Membership Development, Fundraising and Sponsorship, and International Business Development . Director: Giles Crouch (420-0231) - giles@solutioninc.com

On March 10, 1999, ITANS sponsored a conference titled "Do We Have the People? The Nova Scotia IT Industry skills report." at the Halifax Sheraton Hotel.

ITAP (n.d.). "Information Technologies Association of PEI." PEI (Program) http://www.itap.pe.ca/

Industry Development initiatives, to:

- Provide members with the opportunity to enhance their leadership, business management and technological skills through networking opportunities, education programs, information sharing and access to industry expertise.

- Identify and pursue research and other valuable information through affiliation with other IT associations in other provincial and national jurisdictions.

- Assist the IT industry on PEI by supporting the community of IT companies with services that meet their collective needs, and implement programs to combine the technological and marketing effectiveness of its members by sharing resources, information and marketing efforts.

- Cooperate with educational institutions to enhance the competency level and availability of the IT workforce on PEI, through such activities as:

  1.Promoting and assisting educational institutions with curriculum development;
  2.Assisting and facilitating with co-op programs and student placement assignments;
  3.Identifying and assisting to develop training programs that are required for the industry.

- Promote opportunities to network with industry peers, business leaders and government officials.

- Seek out opportunities for financial benefits by pooling of common needs.

  Industry Advocacy initiatives, to:

- Provide input on the development of public policy, regulations and legislation affecting the IT industry on PEI.
- Coordinate and lead lobbying efforts on issues that affect the viability of the IT industry on PEI.
- Develop presentations and initiate ongoing communications with government on policy and industry requirements regarding the development of the industry.
- Actively participate in industrial development advisory groups and/or committees of government.

Knowledge Science Institute (KSI), University of Calgary (n.d.). "Mandate: University of Calgary, Knowledge Science Institute (KSI)." Alberta (Mandate) http://ksi.cpsc.ucalgary.ca/KSI/, 1999, February 18.

The Knowledge Science Institute facilitates the worldwide process of change to knowledge-based economies. The Institute will form a network of links with industry, government and universities and facilitate the study, dissemination and application of information on knowledge science and technology and its social and economic impacts. The Institute will facilitate the development of multi-disciplinary studies of knowledge science and technology. The Institute will undertake system development and application projects involving knowledge-based systems, and train and support others to undertake such projects.

Manitoba Education and Training (n.d.). "Section 2: Training and Employment Programs." MB (Program) http://www.edu.gov.mb.ca/inventory/section2.html, Feb. 10/99. excerpts:

- Apprenticeship training programs for designated trades in Manitoba are industry based and industry driven.
- Aboriginal Apprenticeship Training Initiative (AATI) has modularized and re-sequenced the regular apprenticeship program so that participants receive training in all residential construction techniques in concert with local construction projects.
- Senior Years Apprenticeship Option (SYAO)... While in paid productive employment, participants will train under the guidance and supervision of an individual qualified in the trade and the Apprenticeship Branch.

Manitoba Education and Training (1998, May). "Manitoba Education and Training." MB (Strategy) http://www.gov.mb.ca/chc/press/top/1998-05/may1504.html, Feb. 10/99. excerpt –

The government will double the number of MB apprentices to meet the needs of the industrial sector by improving apprenticeship through measures such as (as a response to the recommendations of the provincial task force report entitled "Apprenticeship--Made in Manitoba":

- doubling the capacity of the program within three years to 6,000 with 4,000 enrolled in formal technical training;
- increasing the budget to $3 million to support expansion and innovations in the delivery of technical training, beginning the shift from federal Employment Insurance training funds;
- improving the process for trade designation and for developing training programs and standards through amendments to the Apprenticeship and Trades Qualifications Act and strengthening the roles and authority of the Apprenticeship and Trades Qualifications Board and Trade Advisory committees; and
- strengthening links between the provincial system and high school trades training with enhanced support of the Senior Years Apprenticeship Option.

Manitoba Education and Training (n.d.). "Planning for Technology Implementation - Technology as a Foundation Skill Area." MB (Program) http://www.edu.gov.mb.ca/metks4/tech/techplan/index.html, Feb. 12/99.

The purpose is to assist curriculum developers, teachers, and administrators in understanding the role of information technology as a foundation skill area in classroom teaching, learning, and assessment. This resource is also intended to assist in planning for and implementing information technology integration.

Manitoba Education and Training (n.d.). "Section 5: Labour Market Adjustment Programs." MB (Program) http://www.edu.gov.mb.ca/inventory/section5.html, Feb. 10/99.

Labour Adjustment Program - assists employers and workers in finding solutions to actual or threatened layoffs due to economic, technological or industrial change. Prevention of a layoff or closure is always the first option considered. Through the joint labour management adjustment committee structure used by this program, many services can be delivered to workers who would otherwise not be available. The program is also active in developing community-based adjustment services. (excerpt).

Manitoba Education and Training (1998-1999). "Curriculum / Multimedia Integration Project - PROJECT STATUS 1998-99." MB (Strategy)
http://www.edu.gov.mb.ca/metks4/tech/currtech/cmi/cmistat.html

Senior 2 to 4 science pilot documents have been integrated with multimedia. Multimedia integration of the Senior Years science foundation for implementation documents will continue as Senior Years science curricula are aligned with the Pan-Canadian Common Framework of Science Learning Outcomes, K-12. In 1998-99, the C/MI Project will focus on curriculum/multimedia integration in Kindergarten to Grade 8 mathematics and English language arts, and Kindergarten to Grade 4 science.

Manitoba Education and Training (1998, May 15). "New Apprenticeship Legislation Introduced." MB (Strategy) http://www.gov.mb.ca/chc/press/top/1998-05/may1502.html, Feb. 12/99. excerpt :

Ensuring that Manitobans can fully participate in a skilled workforce, Education and Training Minister Linda McIntosh has introduced legislation designed to strengthen the apprenticeship system, increase industry involvement and make the regulatory process more efficient. ... The new Apprenticeship and Trades Qualifications Act would accord apprenticeship the same status as other post-secondary educational systems. It sets out the legal framework for the apprenticeship partnership between industry and government. The goal is to make apprenticeship more effective and responsive
through legislative changes...

Manitoba Education and Training (1995, January). "Renewing Education: New Directions - The Action Plans." MB (Strategy)
http://www.gov.mb.ca/educate/metks4/docs/policy/action/index.html, Feb. 12/99. (excerpt)

This document contains key implementation details time frames, policy changes, & legislative amendments to renew education from Manitoba's Kindergarten to Senior 4.... An educational Information System is under development. It will provide an information database that, among other benefits, will facilitate departmental, divisional, and school-based planning and decision-making, and enhance the accountability of the educational system to students, parents, and the community. Distance Education and Technology pilot project grants have been provided to six school divisions.

Manitoba Education and Training (1998, December 16). "Five-year Agreement Renews Commitment to Aerospace Training." MB (Program) http://www.gov.mb.ca/chc/press/top/1998-12/dec1601.html, Feb. 10/99.

Through partnership with industry, provincial and federal governments, funding has been established to ensure job creation, training and sustainable employment. Further, increasing the participation of women and aboriginals is a key outcome of the program. Job creation, training

and human resource planning in the aerospace industry will continue to be supported with a second five-year memorandum of understanding signed today by the governments of Canada, Manitoba and the Manitoba Aerospace Human Resources Co-ordinating Committee (MAHRCC).

Manitoba Education and Training (1998, April 7). "Technology and Science Resource Centre Grants - - - Higher Level of Technology Brought To 17 Schools Offering Industrial Arts." MB (Program) http://www.gov.mb.ca/chc/press/top/1998-04/apr0701.html, Feb. 10/99. excerpt :

Giving Manitoba students the tools they need to compete in a global economy, Education and Training Minister Linda McIntosh has announced $680,000 in funding for technology and science resource centres, bringing a higher level of technology applications to traditional Industrial arts and basic education in 17 high schools throughout the province.... The centres will be available to all students in the school, helping to improve computer literacy as it relates to high-tech equipment and making complicated theories of mathematics and sciences easier to understand through computer applications.

Manitoba Education and Training (1997, January). "Interdisciplinary Middle Years Multimedia." MB (Program)
http://www.edu.gov.mb.ca/metks4/tech/currtech/imym/ovrview.html, Feb. 10/99. excerpt :

Interdisciplinary Middle Years Multimedia is a curriculum-based research and development project sponsored by Manitoba Education and Training. The IMYM project was initiated as part of the education renewal process in response to the identification of technology as a foundation skill area to be integrated throughout all Kindergarten to Senior 4 curricula. The purpose of the project is to develop an effective instructional model that supports integration of multimedia technology with curriculum through an interdisciplinary approach to instruction.

Manitoba Education and Training (1997, January). "Interdisciplinary Middle Years Multimedia Project - PROJECT EVALUATION." MB (Program)
http://www.edu.gov.mb.ca/metks4/tech/currtech/imym/evaluat.html, Feb. 12/99. excerpt :

The purpose of the Interdisciplinary Middle Years Multimedia Project is "to develop an effective instructional model which is interdisciplinary in nature, supports integration of multimedia technology throughout the provincial curricula, and can be implemented in schools across the province." The project presents an alternative delivery method to "conventional" subject-specific instruction. Multimedia technology supports teaching in an integrated manner.

Manitoba Government (n.d.). "Manitoba Agriculture." MB (Program) http://www.gov.mb.ca/agriculture/, Feb. 12/99.

"To sustain and enhance the economic and personal well-being of participants within the agriculture and food chain." The Department has played a central role in the promotion and delivery of technological innovation to the agricultural community for many years. The department offers several programs to assist agri-food producers and processors in diversification, innovation or value-added activities.

Manitoba Government (n.d.). "Industry Development." MB (Strategy) http://www.gov.mb.ca/itt/, Feb. 12/99. excerpt :

Key strategic thrusts include: encouraging business to take advantage of global markets; promoting Manitoba as a prime location for investment; improving access to capital; meeting the infrastructure needs of the new economy; and ensuring that the infrastructure needs of industry are met. In support of innovation, Industry Trade and Tourism offers a number of industry development initiatives and supports third party financing programs.

Manitoba Information Network (1998, December 11). "Midwestern Schools helping to Train Teachers." MB (Program) http://www.min.mb.ca/NextEd/newsletter/NextEd981211.htm, Feb. 12/99. excerpt :

Midwestern School of Business and Technology announces the course series "Microsoft in K-12 Education." The neat aspect of the course is that they are arranged in a "curricular strand," a "technical strand," and a "standard strand". The module not only cover different software products, like Word and Excel, but also are geared to different parts of education, such as the teachers, lead teachers and administrators.

Manitoba Information Network (1999, February 11). "Manitoba Rises to Digital Economy Challenge." MB (Program) http://www.min.mb.ca/, Feb. 12/99. excerpt :

Membership and sponsor boards of the Manitoba Innovation Network will act upon include the development of an apprentice program for aboriginal youth and to work with Industry Trade and Tourism to create a specific database on the health and wealth of the digital economy in Manitoba.

Manitoba Information Network (n.d.). "About MIN." MB (Strategy) http://www.min.mb.ca/NextEd/default.htm, Feb. 12/99. excerpt :

The Manitoba Innovation Network - is a consortium of founding members which brings together a unique blend of information-based organizations whose emphasis is on the information technologies. The focus is on the accelerated adoption by Manitobans of the information

technologies and practices in the effort to enhance global competitiveness. The MIN organization will form, articulate and implement strategies for the information economy and work within the community to develop the requisite skill sets and data bases that would shape the new industries of the future. As such MIN will be able to link Manitobans to similar organizations in the other Provinces.

Manitoba Innovation Network (1994). "State of Innovation Report." MB (Strategy) http://www.eitc.mb.ca/, Feb. 12/99. (excerpt)

Inaugural State of Innovation Report intended to begin the process of building greater awareness regarding the innovation challenge facing Manitoba. The report also relates innovation to the process of change, describing in some detail the close relationship between innovation, wealth creation and long-term economic growth.

Ministry of Advanced Education (n.d.). "Mandate Ministry of Advanced Education." BC (Mandate) http://www.aett.gov.bc.ca/, 1999, February 21.

The BC Ministry of Advanced Education, Training and Technology is dedicated to providing the best post-secondary and skills development opportunities to the provinces youth and adults. This web-site is for anyone; from Youth & Adults looking to gain knowledge and skills, to Education Professionals, Employers & Businesses who want to make use and develop education programs.

Ministry of Advanced Education (1999). "Adult Basic Education in British Columbia Colleges 1998-1999 an Articulation Handbook." BC (Program) http://www.aett.gov.bc.ca/publications_all.htm#G_I, 1999, February 21.

As part of the Adult Basic Education (ABE) Program, ABE Articulation provides adult learners with opportunities to further their education and develop job skills. This handbook contains everything anyone would ever want to know about ABE Articulation.

Ministry of Advanced Education (n.d.). "Charting a New Course." BC (Strategy) http://www.aett.gov.bc.ca/strategic/newcourse/toc.htm, 1999, March 30.

Charting a New Course is the strategic plan for BC's college, institute and agency system. The goal is to ensure British Columbians are equipped to succeed and be competitive in today's economy, helping create a system where students get the most of their investment in post-secondary education and training.

The plan recommends implementing systemwide approaches to complement the strengths and diversity of individual institutions and to promote responsive, flexible and high quality program delivery. The fundamental values and strengths of the existing college, institute and agency system are central to the strategic plan. Please see longer abstract for further details.

National Research Council (n.d.). "NRC-IRAP website." (Program) http://www.nrc.ca/cgi-bin/corporate/external.pl?http://www.nrc.ca/irap/, March 12, 1999. (from the description)

The Industrial Research Assistance Program is a service of Canada's National Research Council (NRC). For more than 50 years, IRAP has helped small and medium-sized Canadian firms create and adopt innovative technologies that yield new products, create high quality jobs, and make industry more competitive.

Two internship programs managed by IRAP will give more than 1,000 recent college and university graduates who are unemployed or underemployed a chance to develop their work skills with small and medium-sized enterprises in Canada. IRAP participates in the Youth Employment Strategy of Human Resources Development Canada through the Science and Technology Internships Program with SMEs and the Science Collaborative Research Internships Program.

Natural Resources Canada (1996, March). "NRCan's Science and Technology Management Framework." (Strategy) http://www.nrcan.gc.ca/dmo/spcb/stfm_e.html, (from the report)

Description: The S&T management framework is a set of guiding principles, management tools and proposed new departmental authorities and flexibilities.

Purpose and Objectives: The purpose of the framework is to help maximize the return on our S&T investment and to ensure that this investment addresses government priorities. It does this by pursuing three objectives: strengthening client focus to ensure S&T programs and projects are relevant and useful; implementing rigorous accountability mechanisms for measuring and reporting progress; and enhancing management practices by investing in employees.

Principles: The principles represent the foundation of the new S&T culture. As the framework is being implemented, they are a beacon, guiding us in the direction in which we want to go.

Management Tools: New management tools are emerging to reflect today's workplace. The framework recommends a combination of new and traditional tools, each building on the strengths of the other.

Management Authorities and Flexibilities: Departmental managers do more and better work when they have the authority and flexibility to make the necessary management decisions. Required authorities and flexibilities will be put forward to central agencies for negotiation.

NBITA (n.d.). "New Brunswick Information Technology Alliance." New Brunswick (Program) http://www.nbita.org/content.hte, March 12, 1999. (from the description)

The New Brunswick Information Technology Alliance focuses on helping its rapidly growing list of members to:

- identify and capture profitable new business opportunities in global markets

- forge new partnerships
- benefit from strategic networking opportunities
- keep abreast of the rapidly growing information technology sector
- create awareness of New Brunswick IT sector capabilities

NBIT Alliance is affiliated with Canada's largest IT Association, the Information Technology Association of Canada (ITAC), allowing access to research work, policy papers, network and other information and events of interest and benefit to the province's IT community. NBIT Alliance is also affiliated with the Software Publishers Association, and is a member of the Internet Society. The NBIT Alliance acts as a voice for members of the province's IT community in public policy and legislative matters affecting the industry.

Network for Science and Technology (n.d.). "Mindset." MB (Program) http://www.mindset.mb.ca/, Feb. 10/99.

Purpose is to increase S&T awareness and participation of school aged children.
excerpt - MindSet's broad mission is to "... act as a catalyst to engage business, education, governmental and non-governmental organizations in helping K-S24 young people experience and embrace the excitement of science, technology, mathematics and innovations so that they can successfully contribute to and enjoy an innovative Canadian society.".

Newfoundland and Labrador Association of Technology Industries (n.d.). "Information Technology Training Initiative." Newfoundland (Strategy) http://www.nati.net/about/aboup4.html, March 12, 1999. .

Niagara College (1998, November 6). "Skill Centre for Motive Power Training." Ontario (program) http://www.niagarac.on.ca/whatsnew/mediarel/1998/98-063.htm, February 25, 1999.

The Skill Centre for Motive Power Training is a centre of excellence at Niagara College for a variety of motive power training programs including apprenticeship, adult retraining and post-secondary programs. The centre will also support a complete line-up of trades updating courses for licensed automotive and autobody technicians. Students will make use of state-of-the-art facilities and equipment including computerized engine control, computerized fuel injection, passive seatbelt restraints and airbag technology, allowing them to keep pace with the quickly changing automotive industry. Niagara College, through the Skill Centre, is committed to work closely with area high schools and students interested in the automotive industry to make the transition from secondary to post-secondary education as successful and seamless as possible.

Niagara College, Integrated Manufacturing and Skill Training Division (n.d.). "Centre for Integrated Manufacturing Training and Applied Research." Ontario (Program) http://www.niagarac.on.ca/student/acaddiv/intmfg/intmfg.htm, February 25, 1999.

The Centre for Integrated Manufacturing Training and Applied Research at Niagara College received $2.64 million in 1998 from the Ontario's Strategic Skills Investment Program. The Division of Integrated Manufacturing and Skills Training addresses the significant growth in Niagara's manufacturing and business sectors which helped contribute thousands of new jobs for the economy. The new Centre will feature a centre of specialization including Computerized Numerical Control (CNC), Computer Aided Design (CAD), Computer Aided Manufacturing (CAM) and related skills training.

Ontario (n.d.). "Ontario Computer Animation and Special Effects Tax Credit." Ontario (Program) not available,

The Ontario Computer Animation and Special Effects Tax Credit helps businesses in Ontario's computer animation industry who specialize in special effects and digital animation technology used in film or television. This tax credit is part of larger group of tax incentives to support employment in key industries and businesses.

Ontario (n.d.). "Better Skills, More Jobs: Ontario's Plan for Tomorrow's Job Market." Ontario (Strategy) not available online.

This booklet describes the Ontario government's plan to improve the skills of the province's workforce as a result of the federal government transferring of its responsibility for training and employment programs to the provinces. Ontario's plan will include:

- Employment services: flexible and adaptable to individual needs, for job seekers and those interested in self-employment; help for employers seeking qualified individuals
- Training programs: basic skills upgrading; on-the-job training and apprenticeship; skills training or upgrading that is job-specific; self-employment assistance; and local skills initiatives and labour market projects to help communities overcome their specific barriers and meet their priorities.

Ontario (n.d.). "Leading Edge Technology Co-operative Tax Credit." Ontario (Program) http://www.edu.gov.on.ca/eng/document/nr/98.01/apprbg4.html, Mar. 31, 1999.

The Ontario Leading Edge Technology Co-operative Tax Credit gives tax credits to companies that create work placement opportunities for post-secondary students enrolled in leading-edge technology education programs, including eligible apprenticeship programs. This measure expands the existing Co-operative Education Tax Credit. This tax credit is part of larger group of tax incentives to support employment in key industries and businesses.

Ontario, Ministry of Economic Development, Trade and Tourism (1998). "Strategic Skills Investment Fund." Ontario (Program) http://www.ontario-canada.com:80/medtt/edtlib.nsf/504ca249c786e20f85256284006da7ab/422263d3445cda588525666d004d1b74?OpenDocument, February 18, 1999.

The Strategic Skills Investment is a $30 million initiative announced in the 1998 Ontario Budget. Its objective is to accelerate the introduction of forward-looking skills development collaborations between industry and education providers. Projects will be funded on a competitive basis. The focus is on:

- creating strategic skills essential for building business competitiveness
- expanding opportunities for training for high-demand jobs
- improving Ontario's public and private training capacity.

Ontario, Ministry of Education and Training (1998). "Ontario Graduate Scholarships in Science and Technology." Ontario (Program) http://www.edu.gov.on.ca/eng/document/nr/98.09/grad.html, Mar. 31, 1999.

The Ontario Graduate Scholarships in Science and Technology will provide up to $75 million for the next 10 years to Ontario universities for scholarships for graduate students in science and technology disciplines. At least 500 graduate students will receive new scholarships each year. The provincial government will finance two-thirds of each award and each university will be responsible for finding private sector sponsorship for the other third. Each university will be allotted a specific number of awards based on full-time graduate enrolment in science and technology programs. Eligible disciplines include programs in applied sciences (engineering), biological and life sciences and physical sciences.

The scholarships are one way of stopping the "brain drain" by helping to ensure that Ontario develops the skilled researchers it needs to compete in the 21st century.

Ontario, Ministry of Education and Training (1995 - 1998). "Technology Incentive Partnership Program." Ontario (program) http://www.edu.gov.on.ca/eng/program/tipp/tippgene.html, February 18/99.

The Technology Incentive Partnership Program (TIPP) was designed by the Ontario government to ensure that the province's schools remain in stride with developments in information technology. High school students should graduate technologically literate. TIPP is intended to foster collaboration among school boards, faculties of education, and the private sector in better integrating information technology into Ontario's elementary and secondary school systems.

Ontario, Ministry of Education and Training (1998). "Access to Opportunities Program (ATOP)." Ontario (Program) http://www.edu.gov.on.ca/eng/general/postsec/atop/atop1.html, Mar. 31, 1999.

The Access to Opportunities Program will provide $150 million over three years to double the number of spaces in undergraduate computer science and high demand engineering programs at Ontario universities such as electrical engineering, computer and software engineering, communications engineering. In addition, universities and colleges can access one-time expansion funding of up to $19,600 per student space through the Access to Opportunities private sector matching program; Ontario will match private sector contributions toward the one-time costs of program expansion, up to $9,800 per space.

The program is meant to address shortage of qualified professional in the high growth sector of engineering and computer science. In Ontario, the demand for graduates of high-tech computer science and engineering programs exceeds the supply. During the past 10 years, two of every three new jobs in Ontario were created in knowledge and technology-based industries.

Ontario, Ministry of Education and Training (n.d.). "College Program Standards." Ontario (Program) http://www.edu.gov.on.ca/eng/general/college/progstan/intro.html, February 18/99.

In August 1996, as part of a government restructuring responsibility for the continuing development of college program standards was transferred to the Ministry of Education and Training. Standards for 24 programs were published between 1994 and 1996, and those standards remain in effect. The Ministry's objective is to continue and accelerate standards development for other programs.

The Ministry of Education and Training oversees the development of standards for each program, in order to clearly identify the essential skills and knowledge that graduates of that program must acquire. Each college is required to ensure that its programs and program delivery are consistent with these standards, and must assist students to achieve these essential outcomes. Employers, industry and professional associations, and program graduates currently working in the field are all involved in the development process, as are representatives of the colleges themselves. This way, students can be assured that the programs are relevant to the needs of employers and that the skills they acquire during their program will be appropriate.

Ontario, Ministry of Education, Skills and Training (1997). "You and the Job Market." Ontario (Program) http://www.edu.gov.on.ca/eng/document/brochure/youjob/youjob.html, March 31, 1999.

A booklet that helps job seekers to match their skills with occupations. Identifies employability skills from the Conference Board of Canada as well as high growth occupations to the year 2000.

Ontario, Ministry of Education, Skills and Training (n.d.). "Job Connect." Ontario (Program) http://www.edu.gov.on.ca/eng/training/cepp/cepp.html, Mar. 31, 1999.

Job Connect is a $110 million employment preparation program designed, among other things, to match employers to people who want to learn in-demand skills.

Ontario, Ministry of Education, Skills and Training (1998). "Ontario Youth Apprenticeship Program." Ontario (Program) http://www.edu.gov.on.ca/eng/training/apprenticeship/oyap.html, Mar. 31, 1999.

The Ontario Youth Apprenticeship Program (OYAP) offers Ontario secondary school students the opportunity to train as registered apprentices while enrolled in school. It allows a student to complete his or her Ontario Secondary School Diploma (OSSD) and to gain apprenticeship training towards a Certificate of Qualification with journeyperson status in a skilled trade.

Ontario, Ministry of Education, Skills and Training (1998, December). "Secondary School Reform. Stepping Up! Your Guide to Ontario's New Standards for High School." Ontario (Program) http://www.edu.gov.on.ca/eng/document/brochure/stepup/stepup.html, Mar. 31, 1999.

The Ontario provincial government's reform of the secondary school curriculum is designed to address several goals:

- to help young people make informed career choices by strengthening guidance and career education programs, ensuring that students have access to information on a range of career opportunities, and giving students valuable work experience through co-operative education, work experiences and Bridges school-to-work program.

- to emphasize math, language and science

The reform is integrated with changes to the apprenticeship system. The Ontario Youth Apprenticeship Program, which is the Secondary School component of Apprenticeship training, will provide students with information and enable them to begin apprenticeship training before completing high school.

Ontario, Ministry of Education, Skills and Training (1999). "The Apprenticeship and Certification Act." Ontario (Program) http://www.edu.gov.on.ca/eng/document/nr/98.06/apprent.html, Mar. 31, 1999.

The Apprenticeship and Certification Act reforms Ontario's apprenticeship system. The goal is to double the number of people entering apprenticeship programs to 22,000 from 11,000 per year by encouraging more employers to train apprentices, and by providing a framework for more young people to get involved in apprenticeship training. The new system expands the apprenticeship system to new trades and skill sets. The new system will focus on learning outcomes for identified skill sets within a trade or occupation. It also allows more flexibility in the time limits for obtaining certification.

Ontario, Ministry of Education, Skills and Training (1998). "The Ontario Curriculum, Grades 1-8: Science and Technology, 1998." Ontario (Program) http://www.edu.gov.on.ca/eng/document/curricul/scientec/scientec.html, Mar. 31, 1999.

The new Ontario Curriculum, Grades 1-8: Science and Technology, 1998 replaces the sections of The Common Curriculum: Policies and Outcomes, Grades 1-9, 1995 that relate to science and technology. All science and technology programs for Grades 1 to 8 are to be based on the expectations outlined. Students graduating from Ontario schools require the scientific and technological knowledge and skills that will enable them to be productive members of society. They also need to develop attitudes that will motivate them to use their knowledge and skills in a responsible manner. This curriculum outlines the knowledge and skills that students must develop in Grades 1 to 8, as well as the levels of achievement at which they are expected to master them. It is these levels that teachers will use to assess students' achievement.

Ontario, Ministry of Energy, Science and Technology (1998). "Premier's Research Excellence Awards." Ontario (Program) http://www.est.gov.on.ca/english/st/st_rtd.html#prea, Mar. 31, 1999.

The Premier's Research Excellence Awards is investing $75 million over 10 years to help world-class researchers at universities, colleges, hospitals and research institutes attract talented people to their research teams.

The awards program will help to ensure that Ontario attracts and retains the pre-eminent researchers it will need to keep Ontario's research capacity at an international level of excellence. The program supports training for graduate students, post-doctoral fellows and research associates.

Ontario, Ministry of Energy, Science and Technology (1998). "Ontario Research & Development Challenge Fund." Ontario (Pprogram) http://www.ene.gov.on.ca:80/energy/news/0305a.htm, Mar. 31, 1999.

The Ontario Research & Development Challenge Fund promotes business-industry partnerships for the purpose of attracting world-class leading-edge researchers and supporting research that has benefits for growing industries. The Fund mainly targets natural sciences and engineering, mathematics, health sciences, and environmental sciences. The Fund aims to attract and keep top scientists and researchers in Ontario by providing funds for research, equipment and facilities and incentives for individuals.

PEI Government (n.d.). "Knowledge Economy Partnership." PEI (Program) http://www.gov.pe.ca/kep/eng/partners.asp, March 12, 1999. (from the description)

The Work of the Committee
The committee focuses on four key areas: Service Delivery, Knowledge Transfer, Enterprise

Development and Common Infrastructure. Working groups have been established to develop action plans in each of these critical areas. The work of these four groups is ultimately intended to position PEI to take the best possible advantage of a changing economic and political environment in partnership and cooperation between governments and the private sector in PEI.

Policy Research Networks (1998, March 23-24). "Knowledge-based Economy and Society (KBES) Pilot Project." (Program) http://policyresearch.schoolnet.ca/keydocs/kbes-seas/seasrap-e.htm, March 12, 1999.

This site provides a description of workshop sessions that were run in 1998 to address the knowledge-based economy. The following sessions were included:

- The Knowledge-Based Economy
- The Knowledge-Based Society
- Human Resources in the Knowledge-Based Economy and Society

These sessions, featuring high-profile government and academic representation, described various analyses of the current Canadian situation with regard to knowledge-based industry. The third session on human capital suggests that standard indicators of skill are not always reliable, as education level (for example) does not always correspond with ability to do the work. There was also considerable discussion of the changing nature of work and how this impacts on changing skill needs and adaptability.

Red River College (RRC) (n.d.). "Red River College (RRC)." MB (Program) http://MDTC.RRCC.MB.CA/Press/anniversary.html, Feb. 10/99. excerpt :

Market driven training program - formed to meet training requirements for Federal Youth Employment Initiative, to develop new programming for the College, and to serve the growing demand from the labour market for customized training.

Saskatchewan Education, Saskatchewan Government (1998). "Understanding the Common Essential Learnings: A Handbook for Teachers." Saskatchewan (Program) http://www.sasked.gov.sk.ca/docs/policy/cels/index.html

Individual Common Essential Learnings include:

- Communication
- Numeracy
- Critical and Creative Thinking
- Technological Literacy

- Personal and Social Values and Skills.

Saskatchewan Government (n.d.). "Saskatchewan Research Council." Saskatchewan (Strategy) http://www.src.sk.ca/, Their "mission":

"We exist to help the people of Saskatchewan develop a viable economy with quality jobs and a secure environment. We do this through research, development and transfer of innovative scientific and technological solutions, applications and services.".

Saskatchewan Government (1997, March 26). "Saskatchewan Labour Force Development Board." Saskatchewan (Program) http://www.nald.ca/province/sask/wecs/slfdb/slfdb1.htm, "the

Labour market partners and Saskatchewan will achieve a training system which will be responsive to current and future Labour force development needs. ".

Saskatchewan Government (n.d.). "Evergreen Curriculum, Saskatchewan Education." Saskatchewan (Program) http://www.sasked.gov.sk.ca/docs/evergrn.html

Basically, this document addresses the changes needed in education for K-12 education.

"Core Curriculum is intended to provide all Saskatchewan students with an education — that will serve them well regardless of their choices after leaving school. It reinforces the teaching of basic skills and introduces an expanded range of new skills to the curriculum. "

This is to reflect the changing demands students face when graduating.

Saskatchewan Government (n.d.). "Learning Technology Unit." Saskatchewan (Program) http://www.sasked.gov.sk.ca/curr_inst/ltech/

The goal of the Learning Technology Unit is to build the capacity of the K-12 system to ensure that teachers and learners have: skills in the use of technology in the teaching/learning process access to the global village of human experience, knowledge, information and training access to the "Evergreen Curriculum", a growing/evolving tool in support of the Saskatchewan Curriculum quality materials, which are developed to support Saskatchewan's curriculum.

It is complementary to an educational program that aims to provide students knowledge that they can use in the working world.

Saskatchewan Government (1996). "Science and Technology Unit Information." Saskatchewan (Program) http://edserv.sasknet.sk.ca/curr_inst/scitech/s_tinfo.html

"The Science and Technology Unit of Saskatchewan Education is part of the Curriculum and Instruction Branch that has three units devoted specifically to school/K-12 curriculum developments. The Science and Technology Unit has responsibilities for the science, mathematics, and practical and applied arts areas. "

It has created a curriculum guide for each of these areas to increase science literacy, to provide students the ability to cope confidently and competently with everyday situations that demand the use of mathematical
concepts and to provide them with knowledge and skills to function effectively in our changing and complex technological and market-based society.

Saskatchewan Government (1998, January 14). "Programs and Service, Job Start/Future Skills." Saskatchewan (Program) http://www.sasked.gov.sk.ca/jobstart/index.html

This program, "in partnership with Saskatchewan businesses, industry associations, individuals, public training institutions and other training deliverers provides a range of skills training solutions for Saskatchewan people. [It provides] recognized training and employment opportunities for unemployed Saskatchewan people who need job skills; [provides] employers with the skilled workers they need to fill new positions; [retrains] employed workers for new technology or work processes; [helps] industry associations, communities and training institutions to work together to meet training and employment needs specific to industry; and [enables] public training institutions to respond quickly to industry needs for skilled workers.".

Saskatchewan Government (1998, January 14). "Bridges to Employment, Saskatchewan Training Strategy." Saskatchewan (Program)
http://www.sasked.gov.sk.ca/P/departmental/index.html

"The Saskatchewan Training Strategy will increase training opportunities by approximately 10 percent over what existed in1995-96 before the federal cuts. It will be built on partnerships with business, labour, communities and training institutions. It will keep training programs accessible and tie them more closely to the skilled labour needs of communities, industry and the province as a whole. The Saskatchewan Training Strategy will help both the unemployed and underemployed improve their position in the labour market, and provide the skilled workers that Saskatchewan needs to grow and prosper.".

Saskatchewan Government (1998, January 14). "Departmental Programs and Services." Saskatchewan (Program) http://www.sasked.gov.sk.ca/careers/success/info/ceservices.html

The links to the programs listed in this website generally all have the same initiatives: to provide employment opportunities, to provide training, and retraining to the unemployed and the employed to meet market demands.

Saskatchewan Research Net (n.d.). "SRN Saskatchewan Research Net." Saskatchewan (Strategy) http://www.sask.trlabs.ca/srnet/Default.html, April 7, 1999.

One of the objectives of SRnet (as indicated in the charter and mandate) include:
Enhancing regional industrial and academic expertise in multimedia and broadband networking technologies.

Saskatoon Regional Economic Development Authority (SREDA) (1999, January 12). "SREDA Inc. Programs and Services." Saskatchewan (Program) http://www.sreda.com/services.htm

"The mandate of the Saskatoon Regional Economic Development Authority (SREDA) Inc. is to encourage growth and diversification in the economy of the Saskatoon Region by promoting the development of existing businesses and encouraging the relocation of complementary new businesses to the Region."

Programs and services include:

- Business Retention and Expansion
- Saskatoon Tapping Industrial Potential
- Expansion Assistance
- Business Attraction and Marketing
- Customized Proposals and Tours
- Facilitation and Negotiation
- Active Marketing Practices

This assists with increased employment opportunities.

Science and Technology Awareness Network (n.d.). "STANet." Nova Scotia (Program) http://is.dal.ca/~stanet/, March 12, 1999. (from the description)

For a number of years, the Science and Technology Awareness Network (STANet), has been coordinating science awareness programs throughout Nova Scotia. In just over 2 years STANet projects have impacted on an audience of over 550,000 people, of all ages, education levels and areas of the province and the world. Our goal is to "bring science to the people" by promoting and inspiring innovative projects that will encourage all Nova Scotians to discover and share the excitement and relevance science has in our daily lives. Since 1995, STANet has developed and implemented many projects. STANet coordinates National Science and Technology week activities and other similar programs through the year. The publication of the STANet Science Education Guide, in print and on the Internet, brought together hundreds of educational resources for use by students, teachers, government and the general public. Our Ask-A-Scientist web site was the first of its kind in Canada (Nexxus On-Line, 1995) and garners hundreds of questions per year from inquisitive kids of all ages worldwide. Our programs have earned us national recognition with a Michael Smith Award for Science Promotion. We plan to continue our efforts into the future to further develop Nova Scotia science culture.

Science Council of British Columbia (n.d.). "Science Council Scholarships." BC (Program) http://www.scbc.org/programs/index.html, 1999, February 21.

Science Council's scholarships provide financial assistance to students working on graduate degrees in science or engineering at a BC university. This scholarship is geared for win-win results. The student gains invaluable experience conducting research and development on an industrial problem and the cooperating company gains the fresh and enthusiastic expertise of a talented graduate student. Applications are submitted by the student in collaboration with a company in the BC private sector. The collaborating company must be prepared to contribute a minimum of $2,500 cash or in-kind contribution toward the project costs incurred by each scholarship student. This scholarship is worth up to $20,000 per year.

Science Council of British Columbia (n.d.). "Mandate: Science Council of British Columbia." BC (Mandate) http://www.scbc.org/programs/index.html, 1999, February 21.

It all started in 1978 when the BC Government created the Science Council of British Columbia as a Crown Agency by an Act of the provincial legislature. This was to help give BC the resources and the drive to succeed in the rapidly growing global marketplace. The aim was to be proactive in encouraging the growth of both knowledge-based and value-added resource industries in BC resulting in new industries and enabling the continued success and survival of our traditional resource-based industries. The provincially funded Science Council was given two main responsibilities - providing financial support for applied research and development projects and training and providing the provincial government with advice and information on science and technology issues.

Science Council of British Columbia (n.d.). "BC Science & Technology Awards." BC (Program) http://www.scbc.org/programs/index.html, 1999, February 21.

These awards are this province's highest form of recognition for outstanding achievements by BC scientists, engineers, industrial innovators and science communicators; BC's very own Oscars for science and technology! Awards are presented at the BC Science and Technology Awards Dinner, held every October during Science & Technology Week. Key players in business, industry and academia come together to celebrate and acknowledge the leaders who have made major contributions to BC's economy and scientific culture.

Science Council of British Columbia. (n.d.). "Women in the High Technology Industry." BC (Program) http://www.scbc.org/what's%20new/index.html, 1999, February 21.

The Women in Science, Technology, Trades and Engineering Steering Committee (WISTTE) is undertaking a study of women in science and technology in the high technology labour force in British Columbia. The project entails statistical, survey and qualitative research to evaluate the education and work environment for women in science and technology. A concluding report with recommended strategies to encourage the participation of women in science and technical professions in the high technology industry following post-secondary education in science and technology is expected towards the end of the year.

Skills Canada (n.d.). "Promoting Skill Training for Today's Student." MB (Strategy) http://www.skillscanada.mb.ca/, Feb. 12/99.

Excerpt mandate - Skills Canada-Manitoba is a not-for-profit organization that brings together educators, students, employers, labour groups and government with the common goal to develop the skilled and technical workforce that Manitoba needs to meet the challenges of rapid technological change and expanding global markets. Our goals are to improve public perception of the importance of, and opportunities in, technology and trade based careers; to enhance the quality of technological education and to stimulate the development of technological and employability skills in Manitoba youth.

Stevenson Aviation Technical Training Center (n.d.). "Stevenson Aviation Technical Training Center." MB (Program) http://www.mts.net/~sattic/, Feb. 12/99. excerpt

Stevenson Aviation Technical Training Center offers an apprenticeship based course in aircraft maintenance. When the course is completed, Stevenson students are eligible for the federal government's AME (Aircraft Maintenance Engineer) license - a ticket to jobs across Canada and around the world. Also offers a new course in aircraft maintenance - designed to prepare students for employment in Canada's growing aviation industry.

Telecommunications Learning Institute (n.d.). "Telecommunications Learning Institute." Ontario (Program) http://www.tlilearn.com/index.html, February 25, 1999.

The Telecommunications Learning Institute is the result of a partnerships between Humber College and the telecommunications industry. Its "purpose is to provide a strategic telecommunications learning resource to industry members. TLI's goal is to populate the sector with people whose training is focused, timely and directly related to the demands of the workplace."

"TLI's objective is to ensure that these dollars are spent effectively and that the results can be seen not only on the corporate bottom line, but in the overall economic growth of the sector. To achieve this, TLI offers a highly effective, technologically-based needs assessment tool which will help clients identify critical training requirements and develop specific action plans to address them. By providing performance management and measurement consulting services, clients can determine the desired outcomes and impacts of their training investments.".

The Alliance of Manufacturers & Exporters Canada (n.d.). "The Alliance of Manufacturers & Exporters Canada." Manitoba (Program) http://www.eitc.mb.ca/INNMB/NGO.HTM

The Alliance of Manufacturers & Exporters Canada is Canada's leading business network. Their vision is to continuously improve the competitiveness of Canadian industry and to expand export business. The mission of the Alliance is to achieve their vision by:

- aggressive, effective advocacy to government at all levels;
- delivering timely, relevant information, programs and support of superior quality and value;
- providing opportunities for education, learning and professional growth;
- promoting the development and implementation of advanced technology .

The Canadian Technology Network (n.d.). "The Canadian Technology Network website." (Program) http://ctn.nrc.ca/ctn/ctn.html, March 12, 1999. (from the description)

The Canadian Technology Network links federal and provincial government labs and agencies, universities, community colleges, industry associations, technology centres and economic development agencies. Together these organizations provide innovative Canadian companies with quick and personal access to expertise, advice and information about how to meet technology and related business challenges.

CTN provides a wide variety of information which makes it easy for small and medium-sized businesses to link up with other technology related organizations. This information includes:

- Profiles of organizations that are doing groundbreaking work in the technology sector.
- Profiles of organizations that offer business-related services such as financial, management, marketing and training.
- The names and address of experts in a wide variety of technological fields.
- Offers of technology and service profiles from more than 30 technology-related business sectors.
- Access to testing services, capability and equipment available.
- Research and development interests within universities, and published papers by researchers.
- Sources for relevant documents.

The Manitoba Aerospace Association (1995, December). "Aerospace Training Canada - Taking Canadian Expertise To The World!" MB (Program) http://www.maai.mb.ca/aerov1n5.htm#anv1n5S2, Feb. 12/99. excerpt :

Aerospace Training Canada International will act as a broker and marketer for Canadian learning services, from basic and advanced pilot training, air traffic control training, technical trades training, accident investigation, to aerospace medicine and more.

The Manitoba Aerospace Association (1995, December). "Manitoba Aerospace Firms Take Advantage of Marketing Courses." MB (Program) http://www.maai.mb.ca/aerov1n5.htm#anv1n5S2, Feb. 12/99. excerpt :

MAAI has been working closely with the Manitoba Aerospace Human Resources Coordinating Committee (MAHRCC) to develop initiatives that grew from a series of roundtables, think tanks, and meetings with industry representatives. Six courses over the spring and summer were presented.

The Manitoba Aerospace Association (1995, December). "KIT Aircraft Teaches Students Aerospace Skills." MB (Program) http://www.maai.mb.ca/aerov1n5.htm#anv1n5S2

MAHRCC is playing an active role in developing an appropriate partnership between industry and secondary schools. TecVoc and MAHRCC recently developed a new project for their metals program that would hopefully pique students' interest, as well as expose students to the industry.

TRLabs (n.d.). "TRLabs Saskatoon." Saskatchewan (Program) http://www.sask.trlabs.ca/

"Our research programs are directed towards the future technology and business needs of our industrial participants. Through our partnership with industry and university, we produce a steady stream of talented graduates and industry professionals knowledgeable in leading edge telecommunications technology. They are the transfer agents for our technology."

"Focusing on telecommunications technologies with the best prospects for commercialization, our research and technology transfer programs deliver both the technology and the trained people our sponsors demand.".

University of Alberta (n.d.). "Mandate: Learning and Working: Changing Patterns of School-Work Transition in Canada." Alberta (Program) http://www.ualberta.ca/~glowe/transition/, 1999, February 21.

Are we witnessing the emergence of fundamentally different relationships between education and work, making the traditional distinction between "student" and "worker" obsolete? How do individual youth make personal choices about careers and life-styles within the parameters set by social institutions and economic structures? How have graduates in the 1980s and 1990s adapted their educational and career plans to the new economic realities? These are just a few of the questions addressed by the on-going School-Work Transition Project. Since 1985, we have tracked samples of high school and university graduates in Edmonton (a parallel study also followed Toronto and Sudbury graduates from 1985 to 1989). This panel study has documented a diversity of pathways linking educational institutions, labour markets, and transitions to independent adult status. Compared to several decades ago, these transition patterns are prolonged, diverse, circuitous, and fraught with hazards.

University of Calgary, Knowledge Science Institute (KSI) (1995). "The Learning Web: A System View and an Agent-Oriented Model." Norrie, D. H. and B. R. Gaines. Alberta (Program) http://ksi.cpsc.ucalgary.ca/articles/abstracts.html#InfSci, 1999, Februray 18.

The notion of a learning society has long been promoted as the next stage of evolution of the educational system from the incubation of skills and knowledge to the development of capacities which enable people to learn continuously for the rest of their lives. This paper presents progress in the development of the Learning Web, an agent-oriented network supporting knowledge access, collaboration and simulation, in order to provide a widely accessible learning environment. The essence of the Learning Web is an open architecture supporting integration of heterogeneous subsystems in which there is a natural symbiosis between human and computer agents.

University of Manitoba (n.d.). "Engineering Access Program (ENGAP) - All Manitoba." MB (Program) http://www.edu.gov.mb.ca/postsec/training/engaccprog.html, Feb. 12/99. excerpt :

Funded by the Province of Manitoba, this program is delivered on-campus at the University of Manitoba and is designed to provide Manitoba Aboriginal students with a Bachelor of Science (Engineering) degree who have had limited educational opportunities. [Similar programs from U. of Manitoba and Red River College for needy students who have not had the opportunity for such experience because of social, economic or cultural reasons, lack of formal education or residence in remote areas of Manitoba.].

University of New Brunswick, University College of Cape Breton (1997). "EnviroEntrepreneurs Canada Program." New Brunswick (Program) http://www.unb.ca/web/enviro/yep/, March 12, 1999.

The program is geared for people, no older than 30, who already have a degree or diploma in science, engineering or technology, and who are interested in complementing their technical skills with business education and mentorship to become entrepreneurs or employees in the environment sector. Coursework is available at University of New Brunswick or University College of Cape Breton. Like some others, this initiative focuses on encouraging independent work (e.g. consultancy, contracting, and innovation) for young science, engineering, and technology graduates. The EnviroEntrepreneurs Program offers free tuition, as a pilot program; it also offers a practicum either within industry or by setting up a private business.

Vancouver Centre of Excellence—Research on Immigration and Integration in the Metropolis (n.d.). "Mandate Vancouver Centre of Excellence—Research on Immigration and Integration in the Metropolis." BC (Mandate) http://www.riim.metropolis.globalx.net/, 1999, February 21.

RIIM is one of four Canadian research centres dedicated to studying the impact of Canadian immigrants on local economies, the family, educational systems and the physical infrastructure of cities. RIIM concentrates only in Vancouver but has links to all other Metropolis sites in Canada and the rest of the world. This research group based at Simon Fraser University, the University of Victoria and the University of British Columbia will investigate the impact of immigrants in Vancouver.

Western Research Network on Education and Training (n.d.). "Mandate: Western Research Network on Education and Training." BC (Mandate) http://www.educ.ubc.ca/wrnet/index.html, 1999, February 21.

WRNET is a 5 year research project (1996-2001) exploring the links between education and work by answering the following: what are the results and outcomes of Canadian education programs and policies? And what factors make a difference to those results? The Network is funded by the Social Sciences and Humanities Research Council of Canada (SSHRC) and hosted

by the University of British Columbia, Vancouver, Canada. WRNET also receives support from the University of Manitoba and the University of Alberta. WRNET is one of five Canadian research networks receiving five-year funding from SSHRC. The goal of the SSHRC Strategic Research Networks in Education and Training is to improve the responsiveness and quality of education and training in Canada by studying what kinds of education and training best prepare Canadians to participate effectively in the knowledge-based global economy.

Western Research Network on Education and Training, UBC (1998, October). "The Genesis of Careerowl: The Story of How SSHRC Funded University Research Led to an On-line Electronic Hiring Hall." Nakamura, A. BC (Program) http://www.educ.ubc.ca/wrnet/wpseries.htm#98.10:, 1999, February 21.

CareerOwl is an electronic hiring hall. A web-based program that facilitates job candidate-employer interactions. It is being launched by a volunteer coalition of staff and students at the Universities of Alberta (UofA), British Columbia (UBC) and Western Ontario (UWO). The service is available for free to all Canadian post secondary students and alumni. The main objectives of CareerOwl are as follows: to enable students and alumni to obtain information conveniently about employment opportunities throughout Canada; to improve the information available about career outcomes, thereby facilitating better education and career planning.; to help Canada realize higher returns on tax dollars invested in post secondary education; to help combat the brain drain of specialized talent to the US by making it easier for Canadians with post secondary training everywhere to learn about job opportunities here.

Western Research Network on Education and Training, UBC (1998, Spring). "Case Studies: British Columbia: Applied Academics." Gaskell, J. and S. Gadsby. BC (Program) http://www.educ.ubc.ca/wrnet/newsl1.htm#Labour Market Analysis Team Projects, 1999, February 21.

Applied academics refers to a program of courses emphasizing the acquisition of academic principles and concepts through classroom and laboratory activities that connect abstract knowledge to workplace and other out-of-school applications. The emphasis is on establishing clear programmatic links between secondary and post-secondary educational programs and workplace needs. This research project involves a study of four sites where applied academics programs have been going on for the last few years. The four sites illustrate different ways in which applied academics has been located in the network of relationships among schools, industry, labour, community colleges and universities, and the Ministry of Education. Attention will be given to issues of gender and to procedures that are developed to evaluate the outcomes.

Women in Science and Engineering (WISE) Newfoundland (n.d.). "WISE Projects: Careers in Your Future; "WISE Ideas" Engineering and Applied Science Kits; Career-a-month posters." Newfoundland (Program) http://www.stemnet.nf.ca/WISE/projects.htm, March 12, 1999. (from the website)

Careers in Your Future
This multimedia computer career information resource was developed by WISE member, and Past President, Sadie Sellars. This interactive tool, currently being redesigned for new technology, is for students in their investigation of the multitude of career options for both men and women, available in the fields of science and engineering. It presents 95 role models who have careers in science, engineering or related fields.

"WISE Ideas" Engineering and Applied Science Kits
Three exciting hands-on kits were designed by Abigail Steel for students in Grade 9 to 12 physics classes. The kits demonstrate "Perpetual Motion", an "Electric Car" and "Water Reclamation". Included with the kit is information about the project and highlights about people who work professionally in these fields. The kits are portable, and are available through the Newfoundland Science Centre for loan to schools around the province.

"Career-a-Month" Poster Series
A series of twelve posters was produced by WISE Newfoundland and Labrador to encourage young people and, in particular, young women to pursue careers in the science and engineering fields. The brightly coloured, eye-catching posters display photographs of actual role models, brief descriptions of their jobs, and information regarding the fields and the study required to enter them. Schools find these posters invaluable guidance resources. Cost per set is $10.00.

WorkFutures (n.d.). "Yukon WorkFutures." Yukon (Program)
http://workfutures.yk.ca/frames/home.htm, March 12, 1999.

WorkFutures, a guide to employment opportunities in the Yukon, is designed to provide information on employment facts, trends in the Yukon labour market, and employment prospects until the year 2005. The guide details 100 significant occupations in the Yukon including a First Nations perspective on employment, chapters on education and self-employment. This resource can assist individuals to make informed career decisions.

Also provides information on an apprenticeship program in a variety of skilled trades, and a listing of programs available through Yukon College.